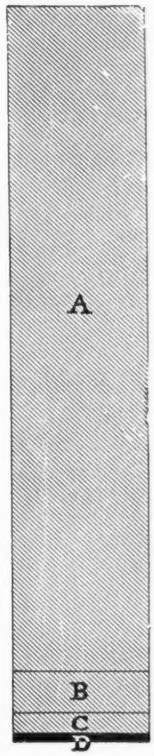
Engineering Library
OCT 31 1921

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Vol. XLV
Number 17

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, OCTOBER 27, 1921

Thirty-five cents a copy
Three dollars a year



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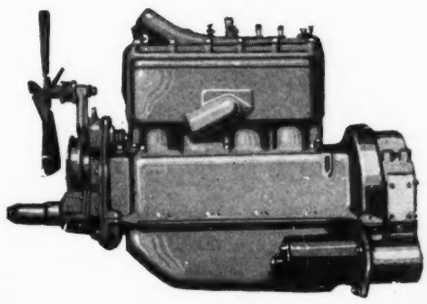

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLV. NEW YORK—THURSDAY, OCTOBER 27, 1921 No. 17

Marketing Problems of the Automotive Industry

Decreased unit production costs have absorbed constantly increasing marketing costs for many years. A limit will be reached. Investigation, analysis and definition are needed in automotive marketing. The beginning of a series of discussions on this subject.

By Harry Tipper

HOW to get the goods from the factory to the user, with the least possible expenditure of time and money and in sufficient quantities to keep the factory running at full load, is rapidly becoming the great problem of industry.

Up to the war the manufacturing capacity of the United States was not quite large enough to equal the consumers' capacity to use the manufactured products. Except in raw materials, the United States was an importing country. Its excess of manufactured imports over exports was sufficiently large to intimate the absence of any surplus capacity to produce.

During the war the manufacturing capacity of the United States grew very rapidly, so rapidly that it increased something over 100 per cent. The present capacity is between two and two and one-half times the capacity of 1913.

There has been no such increase in the markets and, as a consequence, the competition in the near future will operate along different lines from the past.

In the automotive business the present capacity for production of vehicles is larger than the probable consumption for the next year or two. Prices have been reduced without much relation to the cost of production. It is not likely that the cost of production will be reduced sufficiently to secure all the economies that are necessary. Meantime, the costs of distribution and marketing have increased very materially, including the physical costs of transportation, the cost of selling, advertising, the capital required for products in the course of distribution. They are not likely to decrease without changes in the methods, because the intensity of competition will make it necessary to spend more time and effort in securing the unit of sale.

Up to the present the expenditure for selling, advertising and distributing the product has not been analyzed very carefully. Experiments in merchandising, in advertising, and in the distribution of the product have been undertaken without much knowledge as to the probability of their success.

For a number of years production costs have been represented by a decreasing percentage of the sale price, while commercial costs have been represented by an increasing percentage of that price.

It has been possible in the automotive field for the manufacturer to add up his total costs and a percentage for his profit and to sell his product at the resulting price.

It is unlikely that this can be continued. It is more than probable that the manufacturer will have to determine the price at which he can sell his output and arrange to make his costs suit this price, or else eliminate a part of his profit. In other words, until the war, the seller in the United States usually governed the price; whereas, the situation in the immediate future means that the buyer will govern the price, and the seller's profit will depend upon his ability to arrange his costs within that price.

For a good many years it has been the custom to put the problem of cost reduction up to the production department. In the eyes of the manufacturer almost any expense has been justified in the selling or commercial end of the business. Little or no attempt has been made to analyze the expenditures of the commercial departments and the relation between these expenditures and their value to the organization. Very little has been done to analyze the field and channels of distribution, to determine the type of distributor and dealer necessary to the business and to determine cost of the various elements concerned in the handling and distribution of the products.

The cost of producing the automobile or truck has been less than 50 per cent of the price which the user was called upon to pay, and in the case of parts and accessories, it was frequently less than 30 per cent. All the rest of the cost arises out of the marketing or commercial necessities and inefficiencies.

Economic surveys show that the efficiency of production has been increased in the last twenty years, and the efficiency of distribution has been decreased, so that it takes more people to distribute a thousand dollars' worth of goods to the user than it did 20 years ago. A great deal of the sales and marketing effort has been based upon guesswork, impression and the fragmentary experience of individuals, without the rechecks established on the production side. Many of the costs of these marketing efforts have been overlooked, because the systems of cost accounting in commercial business have not been analytically arranged to indicate the relative costs of various sales and marketing operations.

Although it is obvious that the buying power of dealers varies greatly and that they are not all worth the same time and effort to secure their business, most manufacturers have conducted their marketing business as though all distributors and dealers were equally important. The sales, advertising and merchandising work has been conducted with almost equal attention to all types. Only comparatively few of the individuals in any community are either interested or capable of being interested in an individual product. Yet manufacturers have conducted their advertising work as though all individuals were equally important as possible buyers of the product and merited an equal amount of time and effort in the endeavor to induce them to buy.

Branches have been established with little relation to their necessity and value. Extra services have been added without any proper consideration of their influence.

The motions that are made in marketing and the department created for the purpose of assisting the sale, have been conducted with very little analysis of the relation between their value and their cost. Because these departments were concerned with getting orders and the orders were looked upon as the most important part of the business, expenditures were permitted that would have been immediately curtailed in any other branch of the establishment.

The marketing problem of the maufacturer to-day is the problem of investigation, analysis and definition. The commercial operations in his business, their relation to the sale of the product, their cost and their value in connection with the sale must be determined. Consideration must be given to the methods and channels of distribution, their relative importance, their grouping and the necessary values they exert in connection with his business.

The examination should include the habits of the user, his problems and ideas, his resistance to sale and matters concerned with how he can be influenced and interested.

Competition must be estimated and considered not with the emphasis usually placed upon it, but with some consideration of its intensity in different localities, its territorial influence, and its effect upon the necessities and costs of selling in those particular sections.

Unfortunately, there are no standard methods and there are no fundamental bases laid out for this consideration.

One manufacturer of automobiles has succeeded in making a very good business without using distributors, without a large sales force and branch offices, and without the usual amount of merchandising and advertising effort. Another concern operating in about the same price class has succeeded with methods diametrically opposed to the first. Out of such apparent contradictions it is difficult to determine the elements of value. Experience does not teach very much under such circumstances. In any case, the teaching of experience is much more largely concerned with showing what to avoid, rather than what to do.

The great strides which have been made in the production of automobiles, trucks and other automotive products are due to the constant and continual investigation and analysis of the engineering and production factors. The most constructive thought, the most careful research and the most definite study have gone into the production of the vehicle, so that this production represents a very large and efficient service of unusual value to the user.

On the other hand, sales executives have been recruited from successful salesmen, forceful and alert men of the speculative type, efficient publicity men and individuals from many other lines. These men have not associated themselves together in the interests of more efficient methods and their practice has been widely different, sometimes contradictory and frequently entirely experimental.

It is not sufficient, therefore, to consider the marketing problem in the automotive field entirely from the practice which obtains in the field at present, nor from

PROBLEMS of marketing are absorbing much of the time of manaufacturing executives. To decrease the cost of selling a given unit is an important industrial problem. This article marks the beginning of a series of discussions of marketing fundamentals which will appear every other week in AUTOMOTIVE INDUSTRIES. Mr. Tipper's broad, practical experience and his faculty of keen analysis will be brought into these discussions and applied directly to the automotive industry. This first article outlines the present situation and defines the problem.

the apparent success of that practice. Without a knowledge of the factors which have made the practice valuable for one organization, such practice would be of little value to some other organization with a different personnel, a different product and a different sales necessity.

These practical methods are interesting and carry valuable suggestions to the man who examines them. A very large part of their value will be lost, however, unless they are analyzed in the light of fundamental marketing necessities and the elements of the sales problem applicable to the particular organization. The failure of the work in merchandising, selling and advertising so far has been due to the lack of fundamental consideration and our ignorance about the relative value of the different factors entering into the problem.

That is why most of the literature on selling, advertising and merchandising is uninteresting and academic.

For some considerable time AUTOMOTIVE INDUSTRIES has been considering this question of dealing with the marketing.

A great deal of work has been done in the consideration of methods of working with the dealer, the distributor and the arrangements for contracting with the various establishments concerned in the distribution of cars and trucks. A good deal has been said about merchandising statistics, and so forth. However, all these things do not touch the root of the matter and they do not illuminate the severe problem facing the manufacturer to-day.

The tendency is for marketing costs, the costs of selling and distribution, to increase with the area covered and the intensity of competition. These costs already absorb too large a percentage of the total price and they tend to absorb a still larger proportion. They must be cut by making the efforts more efficient, so that less expenditure of time and money is required for the unit of sale.

It is appropriate, therefore, to discuss the elements entering into the marketing problem as related to the merchandising of automobiles, trucks, tractors, parts and accessories, to consider the factors entering into the costs, and to suggest the fundamental tendencies governing these factors. By this means the practical applications recorded in this publication will be made of more value and the examinations of practice more definitely serviceable to the manufacturer.

The only purpose of experimentation is to determine the best method of operation. Where experimentation provides nothing more than the basis for further experiment, it is not justified, and its cost is much greater than it should be. A considerable part of the cost of merchandising and selling arises out of the experimental character of the work and the amount of guess work involved. This is not justified, except as we can discover the best methods by the analysis of the experimental practice.

An article that costs $2 to manufacture must be priced at about $8 to $10 to the user in order that the dealer, wholesaler and sales agent, the transportation company, the warehouse, the rehandler and all the other intervening people can be accounted for and the various profits realized along the line.

The manufacturer is intensely interested in the efficiency of the dealer. This is as important to him as the efficiency of his own sales organization.

Every element of marketing which absorbs too much cost increases the sales resistance and limits the purchase of the product. All these elements are worthy of examination and consideration, in the endeavor to determine the process and methods of most value and the fundamentals governing the cost of the merchandising and marketing operations.

In fact, economies must be made along these lines if the market is to be kept to the highest point of activity. Efficiency must be improved. The improvement of efficiency comes about through the increase of knowledge, and that increase is important to the automotive manufacturer at this time.

Fundamental Photometric Quantities Defined

ENGINEERS connected with the manufacture of vehicle lighting apparatus may be interested in the following definitions of photometric units adopted by the International Commission on Illumination which met in Paris some time ago. The original definitions were in French, and those here given are translations of the French definitions made by the American delegate to the convention. It has been agreed that the final or official English translation shall be one which bears the approval of both the English and American delegates, and it is, therefore, possible that slight changes in wording will be made. The provisional definitions are as follows:

Luminous flux is the rate of flow of radiant energy evaluated with reference to visual sensation. Although luminous flux must strictly be defined as above, it may be regarded for practical photometric purposes as an entity, since the rate of flow is for such purposes invariable.

The unit of luminous flux is the lumen. It is equal to the flux emitted in a unit solid angle, by a uniform point source of one international candle.

Illumination at any point of a surface is the luminous flux density at that point, or, when the illumination is uniform, the flux per unit of intercepting area.

The practical unit of illumination is the lux. It is equal to one lumen per square meter, or it is the illumination at the surface of a sphere of one meter radius due to a uniform point source of one international candle placed at its center.

As a consequence of certain recognized usages, the illumination can also be expressed by means of the following units:

Using the centimeter as the unit of length, the unit of illumination is one lumen per square centimeter, and is called the phot. Using the foot as the unit of length, the unit of illumination is one lumen per square foot, and is called the foot-candle.

The luminous intensity (power) or candle-power of a point source in any direction is the flux per unit solid angle emitted by the source in that direction. (The flux from any source of dimensions which are negligibly small by comparison with the distance at which it is observed may be treated as if it were emitted from a point.)

The unit of luminous power (intensity) is the international candle, such as has resulted from international agreement between the three national standardizing laboratories* of France, Great Britain and the United States of America in 1909.

*These laboratories are the Laboratoire Central d'Electricite, Paris, the National Physical Laboratory, Teddington, and the Bureau of Standards, Washington.

European Engineering Trends Shown at Paris Show

Overhead valve and detachable cylinder heads seem to be gaining favor among French manufacturers. Unit power plants are also in evidence on most models. Left hand steering taken up slowly, but a few have adopted the American standard. Many other new features were exhibited

By W. F. Bradley

BY reason of the big number of small and medium cars which have been produced this year, the four-cylinder engine is in a greater majority than ever before. Considering Continental makers only, it can be declared that for the normal type of car four cylinders are believed sufficient, and six cylinders meet all requirements when a luxury type is desired. There are a few exceptions. Thus Voisin and Fiat have put on the market twelve-cylinder automobiles. The first of these two represents a personal ideal of Gabriel Voisin, and only in a secondary way reflects the state of the market. Fiat appears to have been guided toward a twelve-cylinder car because the firm has a world-wide market and with its reputation can always sell a limited number of cars built irrespective of price. It is certain, however, that Fiat does not count on this type to keep its big factory occupied.

Talbot-Darracq, De Dion-Bouton and Bellanger retain their eight-cylinder V engines, but these are by no means the most important types in their respective programs. Lancia has added a small angle eight to his line, after having experimented for a long time with a twelve-cylinder of the same general design. A certain amount of interest is being shown in the eight-in-line, for four of these have made their appearance this year, built by Bugatti, Panhard-Levassor, Imperia and Isotta Fraschini. The first named is a special sporting model very closely approaching the pure racing type of car, while the straight eight appears to have been adopted by Panhard as a more satisfactory job from an engineering standpoint than the straight six sleeve valve engine. With these exceptions the "four" dominates for the normal type of car and the "six" holds the high-grade field.

It is worth noting that there is a tendency on the Continent to abandon singles and twins for cycle cars and other very small machines. This is contrary to the English practice, where the two-cylinder opposed engine still has a following for small machines built down to the lowest possible price. The French public asks for a straight four, no matter how small it may be.

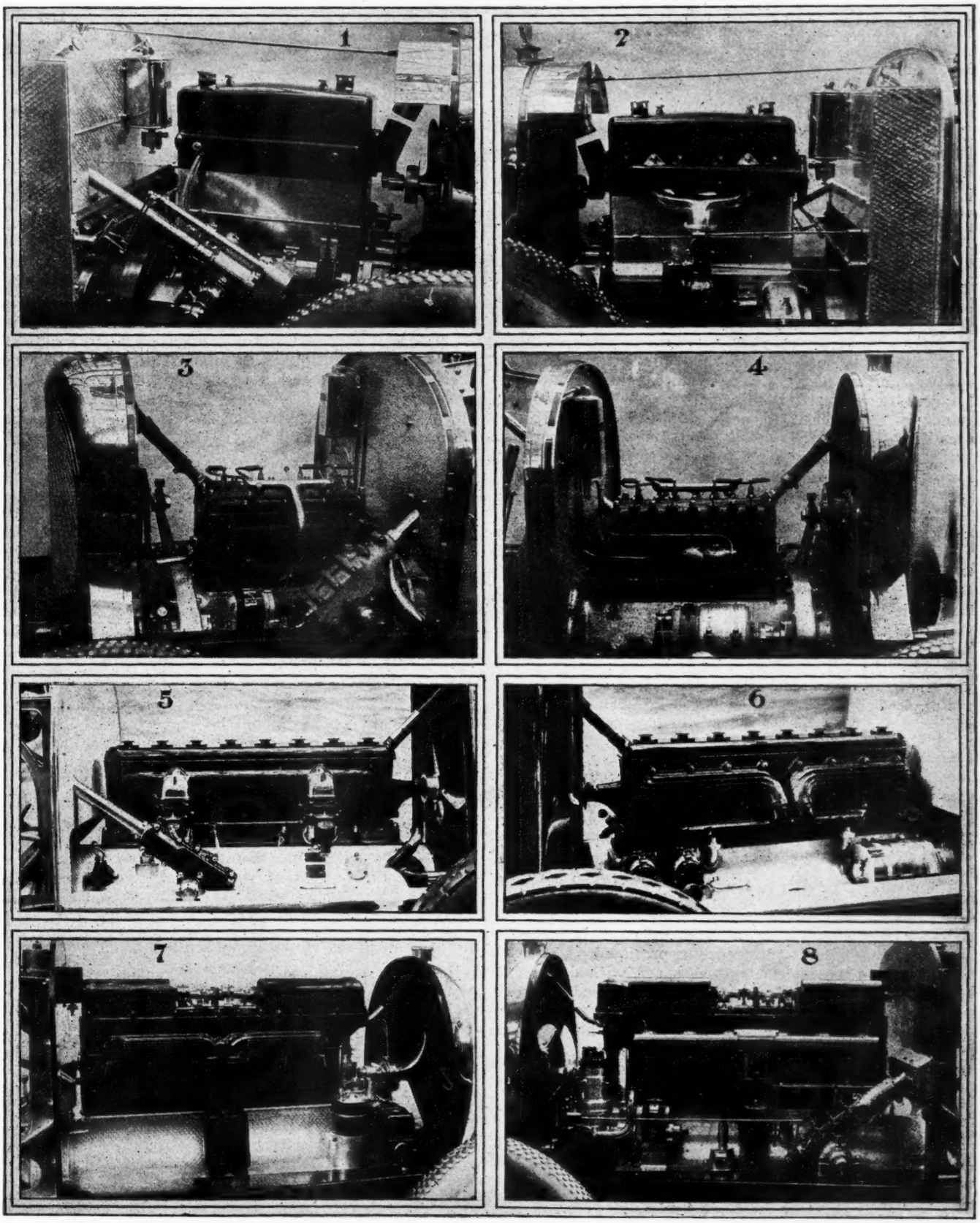
Aluminum Engines Losing in Favor

Aluminum cylinders with steel liners have lost in popularity, the only engine of this type now built in France being the Hispano-Suiza, and Spa the only one made in Italy. Another aviation practice of using forged steel cylinders with sheet steel water jackets has failed to make progress, for this construction is confined to the high-grade six-cylinder Farman. Even on the cheaper makes the preference is for cast iron cylinders on an aluminum crankcase. As an example, Citroen, who makes one of the cheapest cars in the show, has separate castings for cylinder block and engine crankcase. The new sleeve valve Voisin has cylinders, crankcase and gearbox in a single iron casting with the shaft carried in two plain bearings. Talbot-Darracq, on their 10 hp. cheap production job, have cast the cylinders and crankcase together, with clutch and gearbox bolted up to it, as in American practice. The same design has been adopted by the Italian Ansaldo Company, on a cheap production job, by Gregoire, Aries and Alva. These are about the only firms of importance, however, having followed this method of construction.

Overhead Valves More Popular

Overhead valve engines have made progress, the feature in this connection being their adoption by old-established and somewhat conservative firms. Delaunay-Belleville has an entirely new overhead valve six, with operation by pushrods and overhead rockers, the valves being mounted vertically in a detachable head. This firm's system of forced feed lubrication has been extended to the valve gear, the pushrods being hollow, and the oil passing through them to the overhead rockers. Talbot-Darracq has a commercial overhead valve job for the first time; all Hotchkiss models are now made with overhead valves; Lancia has a sporting type overhead valve four, and his eight-cylinder small angle V-engine is also an overhead valve design; Delage is making his sporting six with overhead valves; the Fiat "twelve" has overhead valves with pushrods; the same valve location is used by Lorraine-Dietrich; by Vinot-Deguingand on an engine having the valves in cages and enclosed pushrods; by Leon Bollée, Imperia-Abadal, and Aries with overhead camshaft, by Gregoire, Delaugere-Clayette, Alva and Salmson, with pushrods, and also by a few lesser-known firms, particularly when they specialize on sporting type cars. Even for high class jobs the tendency now is to use a detachable head with a camshaft in the base chamber and pushrods which pass through the cylinder block. The overhead gear being covered by an aluminum housing, everything is inclosed, and it is frequently difficult to tell, from an external examination, whether the camshaft is located in the base chamber or overhead.

An original type of valve operating gear is used on the new six-cylinder Hotchkiss. Instead of a camshaft of the ordinary design, this engine has an overhead eccentric shaft, with short connecting rods having split bearings, which operate forked plates pivoted on a second shaft immediately below the eccentric shaft. The forks are in contact with a steel disc on the extremity of the valve stem. The advantages claimed for this are a greater degree of silence than is possible with the ordinary type of rocker.



1 and 2—A new overhead valve Chenard-Walcker 183 cu. in. engine. 3 and 4—Delaunay-Belleville 10 hp., four cylinder unit power plant with detachable cylinder head and all control parts mounted on engine. 5 and 6 Panhard & Levassor straight eight Knight engine with continuous webs and steering gear mounted on engine. 7 and 8—Hotchkiss six-cylinder engine with detachable head and overhead eccentric shaft, with both magneto and battery ignition

Ballot announced during the show that he would produce a touring car at a commercial price with a 122 cu. in. engine. This is of the overhead valve type, with overhead camshaft and direct operation of the valves, without the use of followers, by a system which, it is declared, avoids side thrust on the valve stem guides.

Battery Ignition on New Models

Battery ignition has gained at the expense of the magneto. In the great majority of cases where a new model has been brought out, battery has been preferred, whether the car was a cheap production job or one of the most expensive. Thus Citroen uses Delco ignition, starting and lighting on his new 5 hp. cheap car; Voisin has Delco on the high-grade "twelve"; Fiat has battery ignition of the firm's own design on the most expensive chassis in the show; Itala has adopted an Italian make of generator-battery ignition on a new sleeve valve six it has produced, and the high-class Hotchkiss six has a combination of magneto and Delco, with the Delco distributor used for the magneto. The high-grade six-cylinder Spa has both battery ignition and a Bosch magneto, the two systems being quite distinct. Paulet, with a good class six, designed by M. Michelat, formerly chief engineer to Delage, uses Delco ignition. Ballot is using Delco on his new car with 122 cu. in. engine. On the other hand, Panhard-Levassor, Lancia and Bugatti have adopted the magneto for their new types. Speaking generally, when new models are laid out battery is used in about 80 per cent of these cases. On an existing model the magneto is never dropped in favor of battery ignition. There is a good example of the current tendency in the Talbot-Darracq models. An eight-cylinder produced since the war, and a 10 hp. built this year, have Delco ignition; a four-cylinder continued from pre-war days has magneto ignition. The fact, too, that many of the French factories placed contracts a year and a half to two years ago with magneto companies and did not take deliveries because of inability to live up to the production programs, has helped in a certain measure to arrest the change toward battery ignition.

Detachable Cylinder Heads Gaining

The change from fixed to detachable cylinder head is continuing, among the firms taking to this being Delaunay-Belleville, Hotchkiss, Léon Bollée, Fiat twelve-cylinder, Delaugère Clayette. There are two cases of the abandonment of the detachable for the fixed head, these being the Delahaye models and a 16 hp. Talbot-Darracq. At the same time the new overhead valve engine built by this latter firm has detachable head; the model which has been changed is largely sold in England, where, it is declared, the detachable head is not greatly appreciated. Delahaye, after building all models two years ago with detachable heads, in which the valve caps had been retained, in order to facilitate the dismounting of valves, has entirely changed design, and is again using a fixed head. Léon Bollée recesses the head 5 mm. into the cylinder barrels so as to protect the gasket.

Cooling Practice

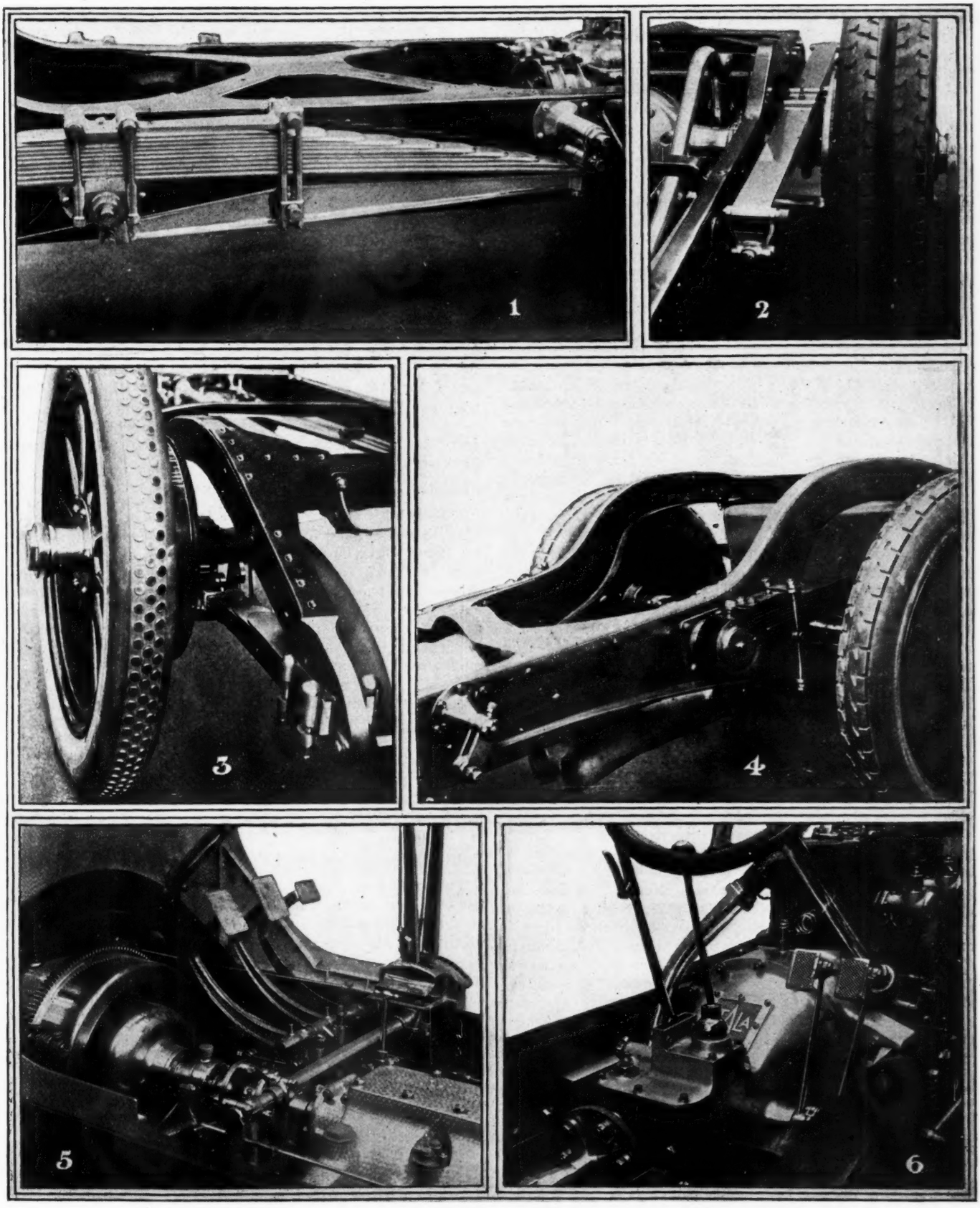
Water circulation by means of pump continues to hold a majority which is very high in the big car class and moderate among the small cars. Apart from Renault, to whom thermo-syphon water circulation is a fundamental principle of car design, the pump is used on about 95 per cent of the cars above 120 cu. in. piston displacement. Below this size, in which class all the cheaper cars are included, thermo-syphon has a strong following. Pressure from clients and dealers in mountainous regions generally enforces the fitting of a pump. Among the conspicuous examples of the abandonment of the water pump on a good quality car is the Delage 11 hp. Talbot-Darracq, with a new and cheaper model of slightly smaller size than the Delage, fits a water pump. Link-type leather fan belts are in the majority, followed by flat leather belts. There is no use of fabric belts, and it is not the practice to use a single belt for driving two organs. Belt-driven impellers in the water circulating system are not used by Continental makers. On a large percentage of the higher grade cars gear driven fans are used, either with a flexible coupling or a clutch. At least 95 per cent of the fans are cast aluminum with two or three blades. Thermostatic control of the water has made no progress since last year except on a very few costly cars, of which the twelve-cylinder Fiat is one.

Unit Power Plants—Continuous Webs

It would be hard to find a new or redesigned model in the show which does not have unit construction of engine and transmission. Among the well-known firms having adopted unit construction for new types are Farman, Itala, Hotchkiss, Voisin, Ballot, Talbot-Darracq, Imperia-Abadal, Delaunay-Belleville 10 hp., Léon Bollée, Delahaye, D. F. P., Delaugère-Clayette. This takes no account of the makers having used this feature for some time. On the small and medium size cars it is customary to attach the power-plant into the chassis by three points. On the small Voisin there are ball and socket connections at the rear of the block and a cylindrical connection at the front. On bigger cars the more general practice is to employ four point attachment to the frame, thus making use of the engine to stiffen the chassis. There is a growing tendency to carry the crankcase webs right up to the frame members, so as to avoid the use of an underpan, or to reduce this to the smallest possible size. On high class cars, generally, the Hispano-Suiza practice is being followed, not only of extending the crankcase webs to the frame members, but of making a tight fit between the bottom of the metal dash and the top of the flywheel housing; thus all the air entering through the radiator must escape laterally through louvres in the engine hood. This gives the clean appearance so much sought after by critical users. Examples are Fiat, Voisin, Delahaye, Imperia-Abadal, and also the Beck, a very original small car, in which this feature is particularly well worked out. Paulet has attained the same object by having a detachable plate between the crankcase hangers, and putting the electric generator and starting motor under this. These parts requiring little attention, there is no loss of accessibility, and a clean unbroken surface is secured from the crankcase to the frame members.

Control Members Mounted on Engine

It is also becoming quite a common practice to mount the steering gear and all the control parts on the engine, independently of the frame members. This practice is being followed out not only on the high class models, but also on the cheaper types, makers having been driven to it from the double standpoint of efficiency and cheapness. Two very good examples are the 11-hp. four-cylinder Delage and the 10-hp. Delaunay-Belleville, which are laid out so that the engine and transmission unit carries all its accessories and can be lifted into the frame complete. Even the accelerator pedal is made quite independent of the dash. With this design the steering gear box is bolted to the engine base chamber instead of to the frame members, and the steering column is stayed to the dash, or in some cases to the instrument board. On the six-cylinder Paulet the steering gear box is attached to the engine base chamber and the column secured by ball and socket joints both to the aluminum dash and to the aluminum instrument board.



1—Star-shaped cross member of frame on Hotchkiss six-cylinder chassis, through which torque and driving thrust are transmitted. 2—Flat platform springs on Delaunay-Belleville six-cylinder chassis. 3—Reversed quarter-elliptic spring on 10 hp. Panhard. 4—Gobron suspension combining a pair of quarter-elliptics and a single leaf cantilever. 5—Arrangement of control members on Delaunay-Belleville six-cylinder chassis. 6—Center control on new Itala chassis

Left-hand steering is being taken up rather slowly. It has been adopted by Citroen, Renault and Lorraine-Dietrich for their big production models. Other firms using it are Paulet, Delage, Farman, Delahaye, Ballot. No enthusiasm is being shown by the French public for left drive, and as all the Continental makers have some interest in the British market, they are obliged to lay out their cars for both left and right-hand drive, according to the country to which they will be shipped. This robs them, in a very large measure, of the advantages of left-hand drive, for if the steering is on the right the levers ought also to be on the right. Some makers get over this by moving the steering from left to right, according to demand, and leaving the levers in the center. This is acceptable on the cheaper grade of cars, but is not looked upon with favor by purchasers of costly cars.

Three-Speed Gear Boxes Increase

The percentage of three-speed gear boxes shows an increase. Makers of the very light type of car have abolished a gear in order to save cost, and on the expensive types it is the high ratio of power to weight which makes a fourth speed unnecessary. The new Talbot-Darracq and the small Voisin are examples of the tendency toward three speeds on light cars; Citroen, Berliet and Lorraine-Dietrich are other cheap cars provided with only three gears. In the powerful and expensive class three gears are used by Fiat, Hispano-Suiza and Voisin. There is a greatly increased use of helically cut gears for constant mesh pinions and for the third combination.

The method of providing for the drive has undergone modifications by reason of changes in the gearset location and in the types of springs. The majority of Continental cars now have central drive, either with a ball head at the front end of the propeller shaft housing, as on all the Fiat models, or with forked arms to a cross frame member or to the rear of the gearbox. Another new example is the six-cylinder Itala. This system of drive has developed to the detriment of the Hotchkiss drive, and has increased with the more general use of cantilever springs. Hotchkiss, among others, has the fork type of central drive on one model and ball head type on another car. Hispano-Suiza abandoned Hotchkiss drive two years ago. Delaunay-Belleville, on the other hand, has taken up Hotchkiss drive on the new 10 hp. car.

On the high-powered models the drive is not taken through the gearbox, but through a heavy cross frame member. This was adopted by Hispano-Suiza two years ago, and is now used on the twelve-cylinder Fiat and the six-cylinder Hotchkiss. On this latter model extreme rigidity is obtained by a star type construction of central cross frame members, the drive being transmitted through the center of this star, and the ends of the cross members giving greater strength for the attachment of the spring shackles and trunnion.

Drive and torque through the springs have been taken up by Delahaye but, speaking generally, this system is only employed to a wide extent on light cars and cycle cars.

Suspension Practice

Rear suspension by means of cantilevers has not made any progress, for while this type of spring is found on several new cars, a few makers have abandoned it, particularly for their faster models. Voisin is an example, the cantilever being retained by this firm for the normal 18 hp. model, but dropped by them for the sporting type chassis, and not used on either the twelve-cylinder or the cheap small car. The objection raised against the cantilever is the lateral instability of the chassis at high speeds, and it is on this account that Fiat has brought forth a special arrangement on the new chassis, the second leaf of the spring being extended rearwards to the rear hangers of the frame. Hotchkiss has a device (see cut) by which it is claimed that variable flexibility is obtained. It keeps the spring under tension, so that the car always rides as if it had its full load of passengers. It is claimed that there is a considerable improvement not only as regards comfort of the passengers, but in the stability of the car on the road at speed.

Renault, on his two big six-cylinder cars, uses long, thick-leaf diagonally mounted cantilevers, which are shackled at the rear below the ends of the axle housing, and at the front end to a rigid central cross frame member. This system was adopted two years ago, when the ends of the springs were carried in rollers. It is declared that the present type, with shackled ends and the front anchorage brought very near the center line of the chassis, has proved very satisfactory, particularly as regards the ability of the car to hold to the road at high speeds. The platform type spring appears to be used only on one of the Delaunay-Belleville models and on Scap cars. Bugatti has adopted his special type of quarter-elliptic spring, with the thick end to the rear, and the thin end shackled to the axle, on his new eight-cylinder model. There is a very similar type of spring on the new 10 hp. Panhard-Levassor.

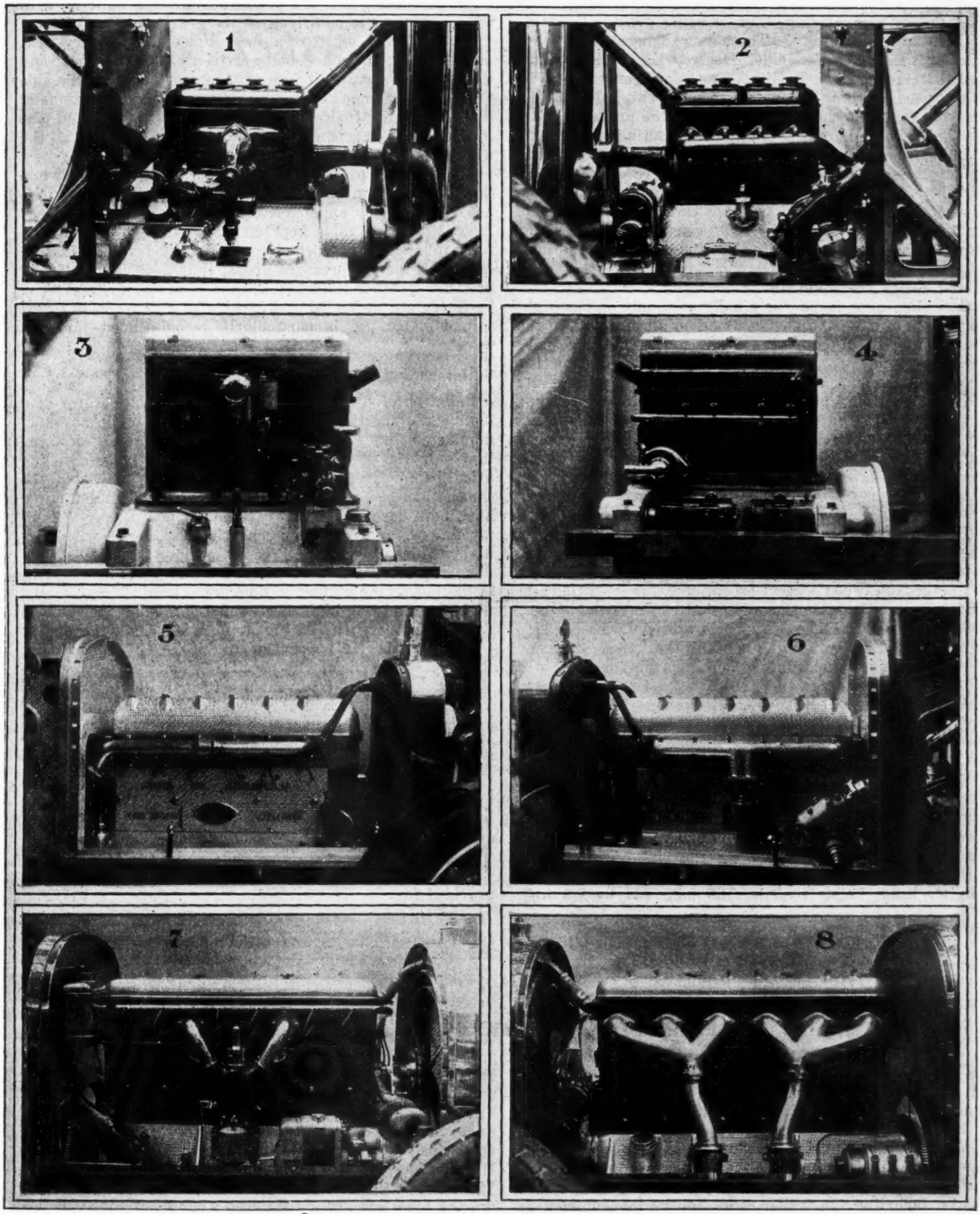
Chassis Lubrication

Oilless bushings for spring shackles are only just beginning to make their appearance, being used among others by Talbot-Darracq and Delage. The only car shown with a quick action force feed gun with pressure or bayonet attachment for the shackles and other parts, as used so extensively in America, is the Hispano-Suiza. On high-grade cars provision is frequently made for automatic lubrication from the inside of the oscillating spring pad on the rear axle housing, thus doing away with an external lubricator on this much neglected part. While much has been done to eliminate parts requiring external lubrication, by reason of more important changes in design (unit construction of engine and gearbox, enclosed engine accessories, enclosed clutch, brake and change speed mechanism, enclosed propeller shaft drive, etc.), little has been done to improve the lubrication of spring shackle bolts, or parts of the steering gear. For these parts the old-fashioned screw-down greaser is still in general use.

Fabric Universals Greatly on Increase

The exhibition shows a most pronounced increase in the use of fabric universals. These are most commonly found on the smaller and cheaper models, examples being Citroen, Mathis, Vinot-Deguingand, Talbot-Darracq, D. F. P., Gregoire, Scap, Sigma and Delahaye; on the bigger cars with enclosed propeller shaft there is also a tendency to use a fabric joint at the front end of the drive shaft, particularly when the torque member terminates in a fork attached to a cross frame member or to the gearbox. An example of this is a six-cylinder rotary valve Itala of entirely new design. On a new Vinot-Deguingand car, with Hotchkiss drive, there is not only a fabric universal at the front end of the propeller shaft, but a fabric coupling enclosed within the flywheel, interposed between this member and the clutch. The clutch, a normal type leather faced cone, is external to the flywheel. A somewhat similar idea has been worked out on the Sizaire-Berwick, by the use of studs in rubber bushings, between the flywheel and clutch. Bugatti has made use of fabric as a coupling between the steering gear column and the steering gear worm shaft.

An important change is the use on a big scale of pressed steel welded rear axle housings. Before the war these



1 and 2—Panhard & Levassor 10 hp. Knight engine, the smallest Knight engine ever built. Note steering gear on engine. 3 and 4—Ballot 122 cu. in. overhead valve engine for a new passenger car about to be produced by the Ballot company. 5 and 6—Paulet six-cylinder overhead valve engine, designed by Michelat, formerly Delage engineer. Steering gear on left is mounted on crankchamber. 7 and 8—Delaunay-Belleville overhead valve six-cylinder engine with detachable cylinder heads and tappet rods at side of cylinders

were very rarely employed, but more modern plants has enabled French and other Continental firms to produce this type of axle housing, thus securing greater lightness with increased strength. Those now using this type of axle are Delaunay-Belleville, Delage, De Dion Bouton, Talbot-Darracq, Itala, Berliet. The same general type of axle is used by Fiat, but in this case the two halves of the pressing comprize the axle housing and the propeller shaft housing. There is only a slight use of all aluminum axle housings, the Bignan with steel tube reinforcements being one of these. In the cycle car class there are some examples of all-aluminum axle construction, but this feature has not been extended to full size cars. Bugatti, on his eight-cylinder, has got very light construction by means of a central aluminum housing for the differential and the two gears, with tubular housings for the axle shaft machined out of the solid billet.

Cast aluminum dashes, originally used only on the highest classes of cars, are now common on all models. In the great majority of cases the dash carries nothing more than the vacuum feed tank and acts as a support for the steering column. There is nearly always a separate polished aluminum plate mounted on aluminum brackets, in which the instruments are recessed. Even on low-priced cars of the Mathis class the aluminum dash is frequently found. Among the high-grade makers only a few of the more conservative firms adhere to the wood dash.

Wheels and Tires

There is not much change so far as wheels are concerned. The detachable wheel, as distinct from the detachable rim, is used everywhere. Renault, Panhard and Talbot-Darracq use detachable wood wheels except for a few special fast models, where the wire wheel is fitted. Fiat is the biggest maker using the Sankey type hollow spoke wheel. This is not a true Sankey, for the hub and the spokes are made of two pressings welded together and then welded to a Michelin rim, whereas the Sankey is a two-piece wheel. The Michelin steel disk wheel is very extensively employed, particularly for the smaller and medium size cars. On very expensive types the wire wheel is a serious competitor.

Straight side tires have not made their appearance, although it was believed one firm would adopt them this year. The clincher bead tire is therefore used exclusively throughout the continent of Europe. Michelin and Bergougnan have both increased the size of their tires for truck service, the largest dimension now made with clincher beads being 1085 by 185 mm. (44 by 7.3 in.). Both these are cord tires. Tire pumps are confined to high class cars, and are practically always built in with the gearbox, or to be driven off the gearbox. Few of them are now driven off the engine. Paulet has a very neat arrangement, the pump being driven off the gearbox, and the lever for putting it into engagement being on the side of the frame member hidden by a circular sheet metal hinged cover. Inside this cover, wrapping around the control lever, is a length of hose sufficient to reach all the wheels on the car.

Michelin has produced an indicator which notifies when the air pressure falls below a determined figure. This apparatus is only applicable to steel disk and wire wheels. It consists of a valve kept off its seat when the tube is fully inflated, but which drops and explodes a percussion cap when the air pressure drops, thus notifying a fall in pressure whether the wheel is in motion or standing. The indicator can be loaded and fitted with a new cap in a few seconds. Its use is particularly recommended for dual wheels.

Ballot Now a Car Manufacturer

Ballot entered the Paris show as the manufacturer of a high-grade sporting type car, guaranteed to be an exact duplicate of his 122 cu. in. racing mounts. It was declared that only 100 of these would be built, the chassis selling price being 80,000 francs. For sporting purposes the chassis had been fitted with electric lighting and starting, aluminum dash, aluminum instrument board, special indicators, etc., and the sample chassis were shown with very highly finished two and three-seater sporting bodies.

Before the exhibition closed Ballot announced that he would put on the market a commercial type 122 cu. in. car, which, while being high class, would be sold at a very much lower price than the racing duplicates. Only the engine was exhibited. It is a clean-cut block-cast four-cylinder with detachable head, overhead camshaft and two overhead valves per cylinder mounted vertically in the head. The vertical drive shaft is in the front portion of the cylinder block and operates a cross shaft with the Delco distributor on one end and the water pump on the other. There are no followers between the cams and the valves, the arrangement being a special one which, it is declared, avoids all thrust on the valve guides. The transmission is a unit with the engine and provides four speeds ahead and reverse. The chassis has full floating rear axle with spiral bevel gears, and drive and torque are taken up by the springs. Both left and right-hand steering are being provided for.

English Gasoline Rail Trucks

TWO interesting, and in some respects novel, petrol engined rail locomotive-trucks embodying the Stronach-Dutton patents have been built by Guy Motors, Ltd., in England. Each truck has two engines of 30 hp. each, duplicated radiators, and are of a unique design. They have been built for use in Ugunda, where the cost per mile for a light railway is about $40,000. The cost of the trucks, including the trailer stock and permanent way, is less than $10,000.

The hauling capacity is 250 tons (British ton 2240 lb.) on the level on low gear and 50 tons at 13 miles an hour on top gear. The front of the tractor rests on a four-wheel bogie with flanged wheels for running on the rails, but the rear wheels are solid rubber-shod and will run outside the rail track on a prepared smooth surface. Provision exists for replacing the rail bogie and wheels with an ordinary Ackerman steering equipment and rubber-shod road wheels.

The powerplant comprises two 30-hp. (1000 r.p.m.) Guy "four" truck-type engines placed side by side over the driving axle, and driving through a couple of cone clutches and a short flexible shaft to a silent chain reducing gear with a dog clutch interposed, which serves to couple both power sets as a common unit. The drive thence through a shaft and four speeds and reverse gear to double reduction (spur and bevel) axle gears.

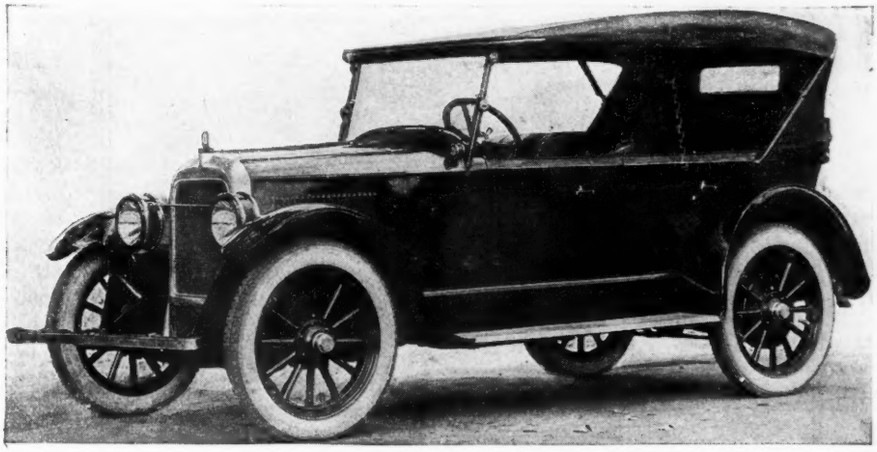
New Earl Car Is Larger Edition of Briscoe

New features are added to the former model, however, and some parts have been changed. The heavier car has called for a more powerful engine. Fittings and trimmings include new appliances and a feature is the design of ignition system enabling operation of all lights with the left hand.

By J. Edward Schipper

AS recently announced through AUTOMOTIVE INDUSTRIES, the Briscoe Motor Corp. has been succeeded by Earl Motors, Inc., and the Earl car, a refined and larger edition of the previous Briscoe, is ready for delivery. The factory has recently been refinanced to manufacture, on a minimum basis, 15,000 cars annually. Production at present, however, is not starting on a capacity schedule, although in a recent statement President C. A. Earl said that plans are being made to double this minimum capacity and to aim for a 30,000 schedule in 1922.

The new car is longer and more powerful than the previous product. The wheelbase has been increased from 109 to 112 in., and cylinder dimensions are 3 7/16 by 5¼ in., as compared with 3⅜ by 5 on the previous model. In conformity with the increased weight of the car, the tire size is now 32 by 4 in. (non-skids, all around) in place of the 31 by 4 in. on the previous product. In mechanical details the car closely resembles the previous Briscoe.



The Earl Model "40" Touring Car

Practically the entire Earl car is manufactured in the Jackson plant, which makes its own engine, transmission gearset, steering gear, front and rear axles. The engine is a four-cylinder, block cast, L-head type with detachable cylinder head, three-bearing crankshaft and four point flexible suspension. This suspension is designed to hold the engine rigid against the torque reaction, but to allow the frame to twist.

The crankshaft diameter has been increased to 2 in. and end thrust is now taken up on the middle of the three bearings by means of flanges. The endplay of the crankshaft is limited to between .002 and .004 in. The attached counter-weights in the former model have been discontinued. The timing gear train comprises steel crankshaft and generator gears and a fabroil camshaft gear with a cast iron center. These gears are cut with helical teeth of 1 in. width of face.

Cooling is by the thermo-syphon system. The hose connections are large, being 2 in. in diameter, and the water jacket on the cylinder is carried below the bottom end of the stroke and all around the valve seats. The capacity of the cooling system is 5 gal. The radiator is located so that its bottom edge is on a level with the bottom of the combustion chamber, which tends to keep the hot water in the top tank of the radiator and the upper half of the core, and the cooler water in the engine.

Fuel is fed from the gasoline tank in the rear and by vacuum to the Scoe 1 in. carbureter. This is a variable venturi type in which the venturi opening on the carbureter is arranged to adjust itself automatically to the load requirements of the engine, so as to maintain constant air velocity at all engine speeds. The electrical equipment of the car comprises a two-unit Auto-Lite starting and lighting system in connection with Connecticut battery ignition. The rear axle is semi-floating with differential and drive gears of nickel steel. The standard gear ratio is 4.66 to 1, instead of 4.18 as on the old model. Hyatt bearings are used in the differential and rear wheels and New Departure radial and thrust bearings in the drive pinion assembly.

The frame is a single drop type with 7 in. side bars braced with five cross-members and two gusset plates. The rear springs are 56 in. in length and the front springs are 36 in. All are semi-elliptic. The front wheels are mounted on Timken roller bearings and the front axle is of the drop I-beam type. The steering gear is a worm and gear type mounted on ball bearings provided with adjustment features. The chassis is lubricated by the Alemite system.

In the trimming and fitting work particular care has been employed to bring the new model up-to-date. The windshield, for instance, is of the new one-piece ventilating type with a glass 38 in. wide. It is leakproof in rainy weather, a molded rubber weather strip being fitted over the cowl immediately under the windshield to give a rain-

(*Continued on page* 816)

A German Passenger Car of Radical Design

The engine is aft and every possible obstacle on the streamline body is removed to minimize air resistance. A single seat for the driver in the center of the car gives him a clear view of the road. Transmission and differential gear, engine and clutch are combined into unit powerplant.

IT seems a rather late day for introducing a design of car in which the principal components are grouped in an entirely novel manner, now that all of the world's leading makers have practically agreed on one standard form of chassis. Yet it must be admitted that the conventional design is not ideal by any means; that many of its features are subject to more or less serious objection, and that there is a possibility of improvement.

A design intended to overcome some of the acknowledged shortcomings of the present conventional passenger car was exhibited by Dr. Edmund Rumpler at the recent Berlin automobile show. Dr. Rumpler is one of Germany's leading aircraft manufacturers, but he has also had considerable experience in automobile design, having been connected in earlier years in engineering capacities with the Adler and Daimler firms. The principal defects which Dr. Rumpler set himself to overcome by his design are the following:

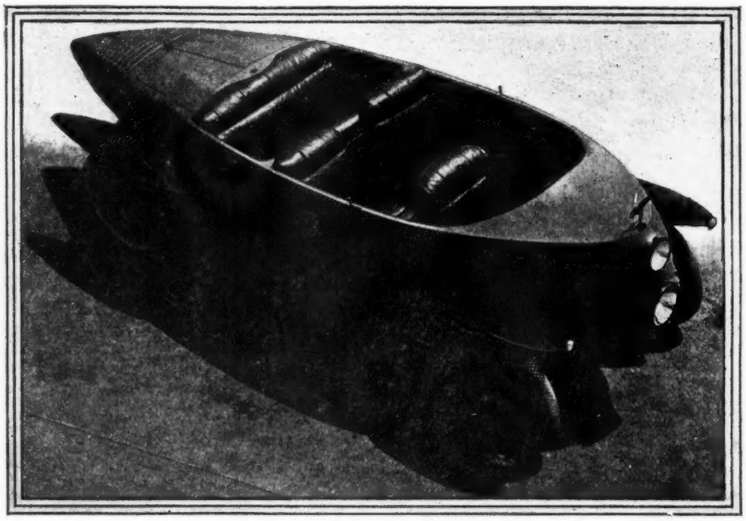


Fig. 1—The Rumpler streamline car

In the standard car, owing to the great distance of the engine from the drive wheels, the efficiency of transmission is rather low. Because of non-conformity of the chassis and body to streamline shapes, the air resistance at high speed is very great, resulting in a waste of power. The suspension is not as good as it might be and prevents fast driving on poor and indifferent roads. Other minor faults are that the shape of the body is such as to raise annoying dust clouds on roads which are not dust-proofed that the rear seat passengers are subject to unpleasant drafts and that sometimes the driver does not command a sufficiently free view of the road ahead.

As may be seen from the photographs herewith, the body of the Rumpler car is of streamline form, running out into a blunt edge in front and a sharp edge in the rear. The steering post is arranged centrally in front, and the control members are located for right-hand operation by the driver. Floating cantilever springs are fitted both front and rear; but whereas the front springs are arranged parallel to the axis of the car inside the body, the rear springs are placed at an angle to this axis and the rear half protrudes from the body. The front axle is of conventional design, with Ackermann type steering, and extends through openings in the frame. Room for spare wheels is provided inside the body, the wheels being carried horizontally and introduced through suitable openings in the frame members.

A six-cylinder W or fan type engine is fitted, and is located back of the rear seat in a compartment of the body. What may be called the stern of the car, *i. e.*, that portion back of the rear seat, is divided by the radiator into two compartments. In the forward one of these compartments, which is covered by the usual bonnet, the engine is located. The bonnet is provided with louvres through which cooling air for the radiator can enter, and the air, after passing through the radiator, leaves the rear compartment through louvres in its wall. Water circulation is by pump, and the air is circulated by a positively driven four-bladed fan.

Engine, clutch, transmission and differential gear with bevel drive are combined into a unit power plant. This whole unit is spring-supported, and only the rear axle ends, which are independently movable of each other in a vertical plane, are unsprung. Thus the unsprung weight is reduced to a minimum, and the car should be very easy riding. Short, light radius rods connect the ends of the rear axle and the extreme rear end of unit power plant, where there is a spherical joint. There is a service brake at the rear end of the unit power plant and in addition there are emergency brakes on the rear wheels. Front wheel brakes are also fitted, the control being by cable passing through the knuckle pins. The muffler occupies the extreme rear end of the body and the car is completely enclosed underneath by an undershield attaching to the frame and extending from tip to tip.

The engine comprises three pairs of twin-cast cylinders set at angles of 60 deg. with each other. Cylinder dimensions are 74 by 100 mm. (2.91 x 3.94 in.) and the engine develops 36 hp. at 2000 r.p.m. There are four valves in each cylinder head, operated by a short camshaft carrying two cams, which is driven from the crankshaft through helical gears. Each cam operates one inlet and one exhaust

valve, and for closing the valves only two springs (leaf springs) are required.

The two-throw crankshaft is completely balanced by balance weights on each crank arm and is mounted in babbitt bearings. There are master connecting rods for the two central cylinders and swiveled rods for the others. Aluminum alloy pistons are used.

Lubrication is by force feed with dry sump, a feature borrowed from aircraft practice. A small plunger pump draws oil from a tank and forces it into the hollow crankshaft. Through oil holes in the crankshaft and small oil tubes extending up the connecting rod shanks the oil reaches the crankpin and piston pin bearings. The surplus oil accumulates in the crankcase sump, and as soon as a certain level is reached therein a second oil pump begins to work and returns the oil to the tank. The drive of the fan is by gear, with the usual friction clutch.

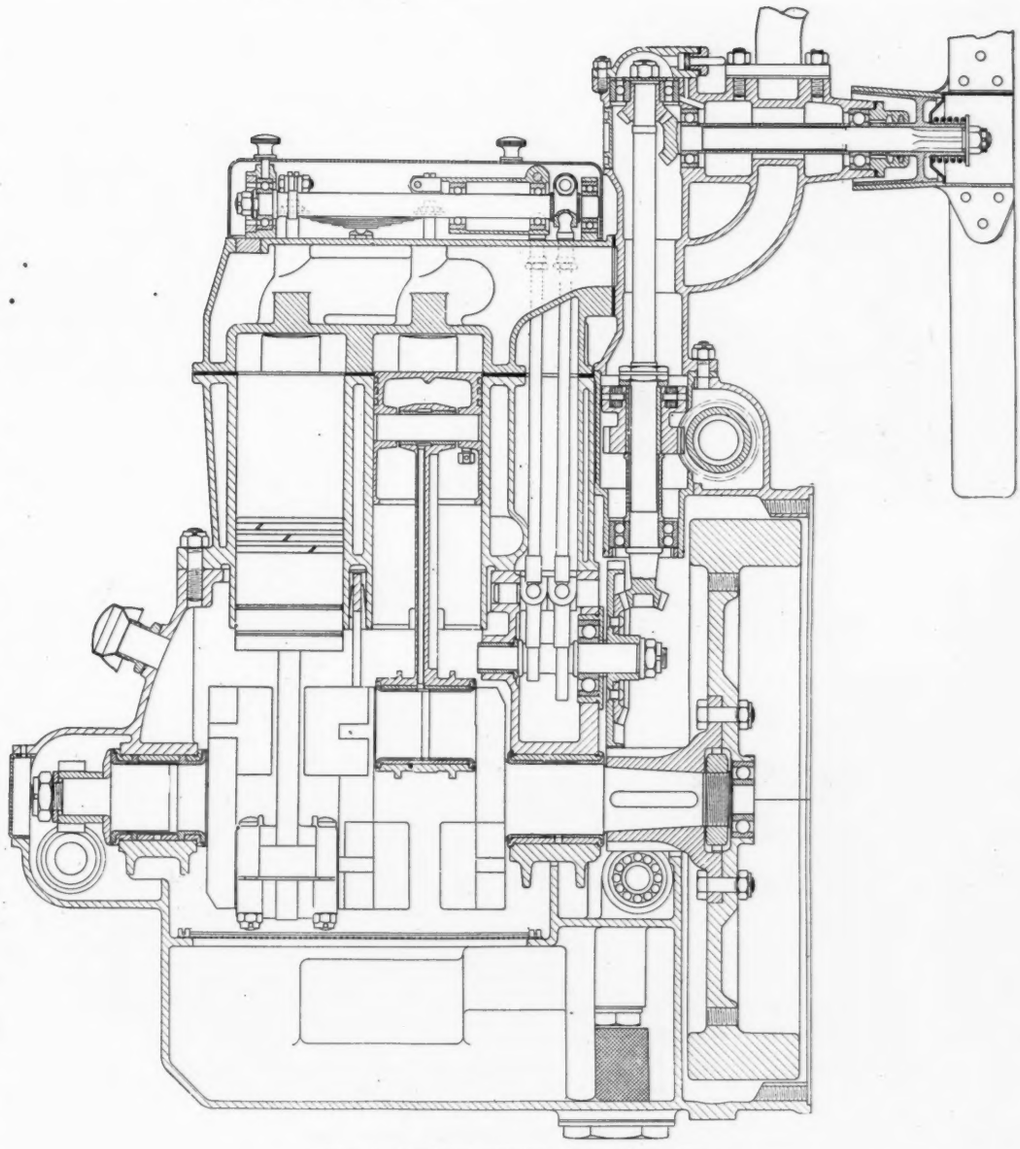


Fig. 2—Vertical section through engine

A sectional view of the power unit is shown herewith and brings out the fact that it is extremely short. There is a multiple-disk-in-oil clutch in the flywheel, with comparatively few disks of rather large diameter. A clutch brake facilitates gear changing. The three-speed gearbox is also unusually short, being rendered so by the fact that there are sliding sets on both the primary and the secondary shaft. The tail shaft of the transmission extends through the center part of the rear axle and carries the differential and the foot brake drum. The arrangement of the bevel gear drive and differential is similar to a design which has been used by Mercedes for the purpose of permitting of arching the axle. Instead of being co-axial with the rear axle, the differential gear is mounted on the driving shaft, and each of its side gears is provided with an elongated hub at the outer end of which there is an integral bevel pinion. Each bevel pinion meshes with a bevel gear on one of the rear axle shafts. The two bevel gears are not of the same pitch diameter, one being sufficiently larger than the other so that its pinion does not interfere with the other gear. Both bevel gear sets have the same ratio, of course. The object of using this design of differential in this case is to permit each axle end to rock independently around the axis of the propeller shaft. In the longitudinal section of the transmission and drive the compact arrangement of the transmission gears will be noted, and it will also be seen that ball bearings are used throughout the transmission and drive. The drum of the transmission brake overhangs its bearing.

In Fig. 7 will also be seen guide slots in the differential housing above and below the driving gear. These two sections are of the same guide slot, which extends all around the cylindrical differential housing and accommodates two guide shoes into which the inner ends of the axle tubes are fastened. This is clearly shown in the sectional view of the rear axle. The driving shafts are mounted in ball bearings in and on the axle tubes, and the axle tubes and shaft together therefore can swing vertically around the propeller shaft axis, the differential housing being provided with large openings for the purpose on both sides, which are closed by means of leather covers. To brace the axle halves in the horizontal plane, radius rods are run from the ends of the axle tubes to a spherical joint at the rear end of the power plant, as clearly shown in the longitudinal section and the photographic view of the power plant. The result of this mounting is that if one of the rear wheels encounters a road obstruction, only that wheel and its half of the axle are thrown up thereby, the central housing of the axle being spring-supported and not directly subjected to road shocks. It is obvious from the above that the unsprung weight is exceedingly small, and it is claimed that this results in unequal smoothness of riding. This effect is obtained without undue complication and without the use of universal joints. In this design the differential compensates not only for any dif-

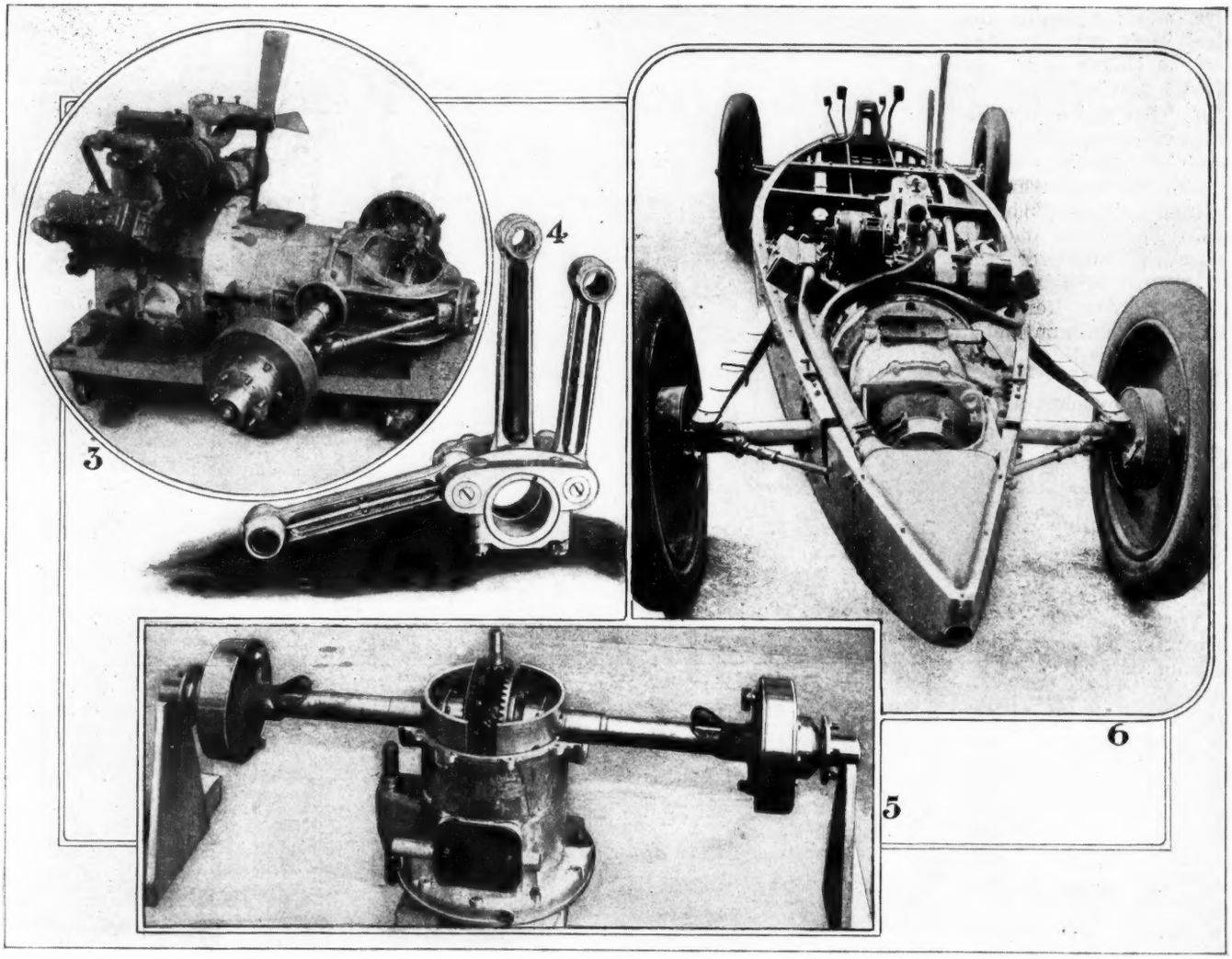
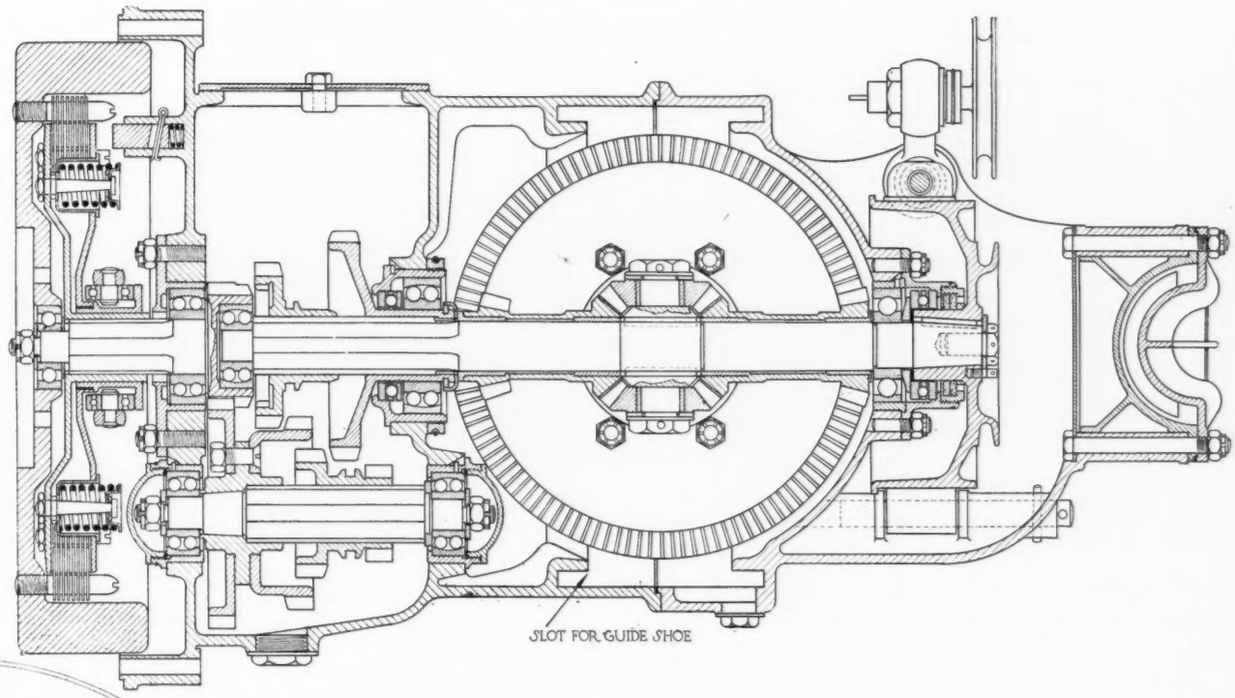


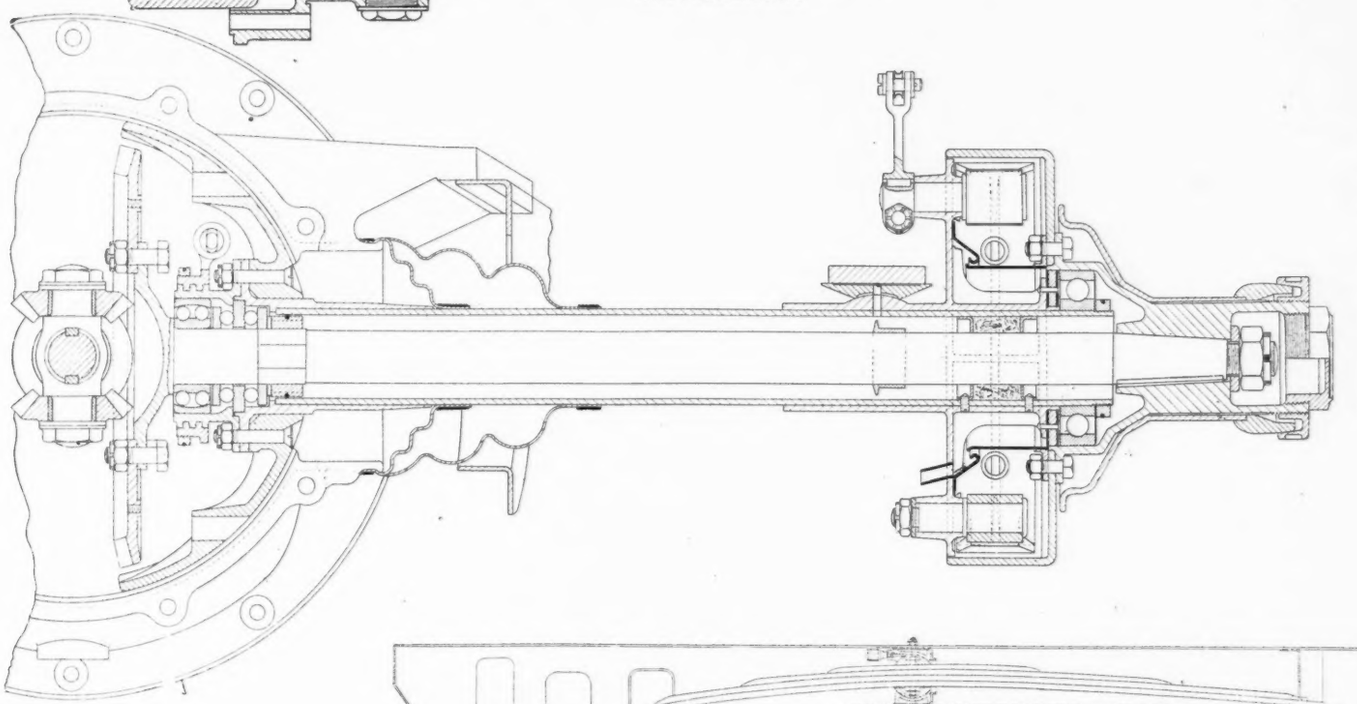
Fig. 3—Power plant and rear axle complete. Fig. 4—Connecting rod assembly. Fig. 5—Rear axle with half of casing removed, showing guide shoes. Fig. 6—Three quarter rear view of chassis

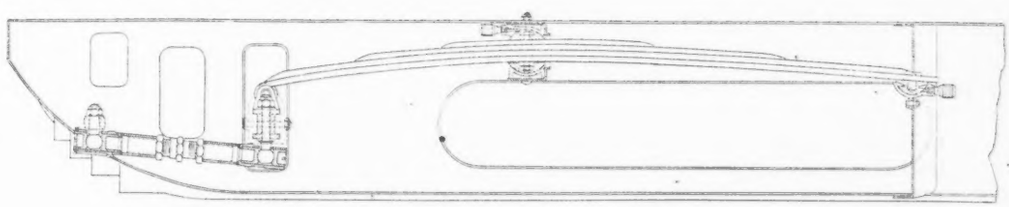
ferences in the horizontal travel of the two wheels, but also for any differences in vertical motion.

Fig. 9 shows the arrangement of the front springs, which are completely enclosed by the frame and undershield. The springs have a spherical mounting at the center on a transverse frame member, and there is a similar connection between spring and frame at the rear end. The front ends of the two springs are pivoted to the front axle, and from the center of this axle an adjustable radius rod with ball joints extends to a frame cross member near the front end of the frame. The frame consists apparently of a single wide channel section, there being a welded joint at the front and a considerable number of cross members, while the muffler joins the two rear ends. Both the main frame channel and the cross members are pressed with large openings, partly to lighten the construction and partly for the passage of control rods and the entrance of the spare wheels. The openings for the spare wheels are closed by pressed steel cover plates.

While the small unsprung weight is a factor tending toward easy riding, the distribution of weight and the arrangement of the seats also influence this factor to a considerable degree. As may be seen from the diagram Fig. 11, in the Rumpler car the passenger seat is located at the center of gravity of the whole car (this center of gravity having been found by taking moments of the weights of the different components in the usual way. In a standard car the center of gravity is usually located at the driver's seat, which, of course, is not as desirable in a car intended to be driven by a chauffeur. In the Rumpler, however, the driver's seat is also well inside the front axle. From the illustrations it is apparent that the car is of quite low build and that its center of gravity must be low. By taking moments in a vertical plane it has been found that the center of gravity is only 28¼ in. from the ground. The weight is pretty well concentrated between axles, and this results in a low mass moment of inertia around a horizontal axis through the center of gravity. This moment is found by multiplying the weight of each part of the car by the square of its distance from the center of gravity, adding these figures, and then dividing by the acceleration of gravity. A Rumpler open car with driver and four passengers weighs approximately 3000 lb. and has a mass moment of inertia of 780 ft.-lb.-sec.^{2}; a closed car with the same number of passengers weighs 3470 lb. and has a mass moment of inertia around a horizontal axis through its center of gravity of 800 ft.-lb.-sec.^{2} It is stated that for standard cars carrying the same number of passengers the weights and moments of inertia are for the open type, 4070 lb. and 1485 ft.-lb.-sec.^{2} and, for the closed type, 4730 lb. and 1515 ft.-lb.-sec.^{2} With a smaller mass moment of inertia, it is stated, if the car body is set in vibration by road inequalities, these vibrations will be damped out more quickly. On the other hand, it would appear that such a body would be set in vibration more easily.







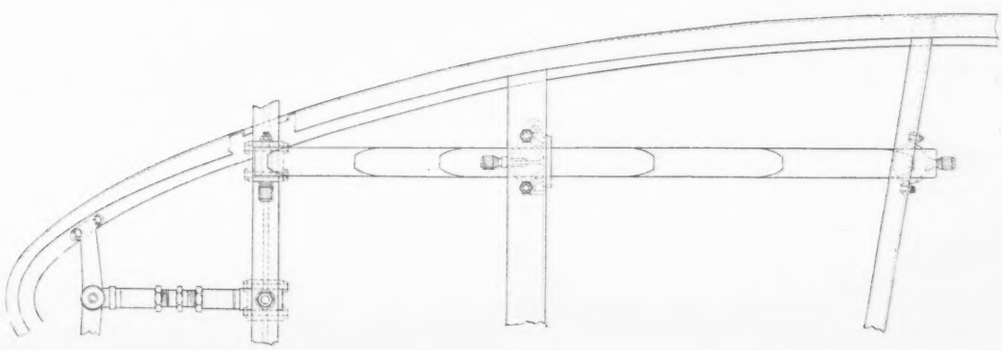


Fig. 7 (Top)—Longitudinal section through transmission and rear axle housing. Fig 8 (Center)—Section of rear axle. Fig. 9 (Bottom)—Front spring assembly

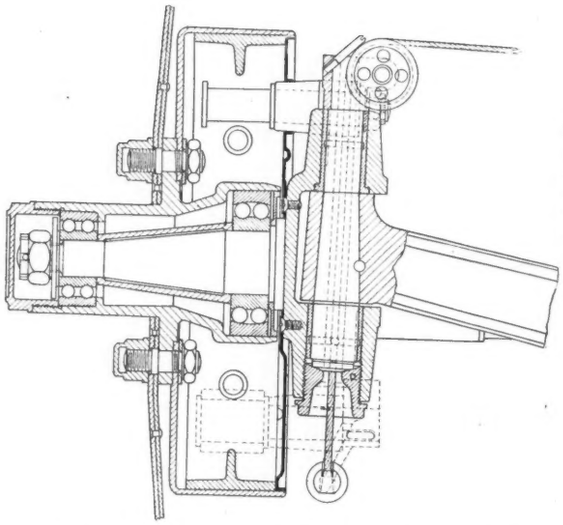


Fig. 10—Front axle end with front wheel brake

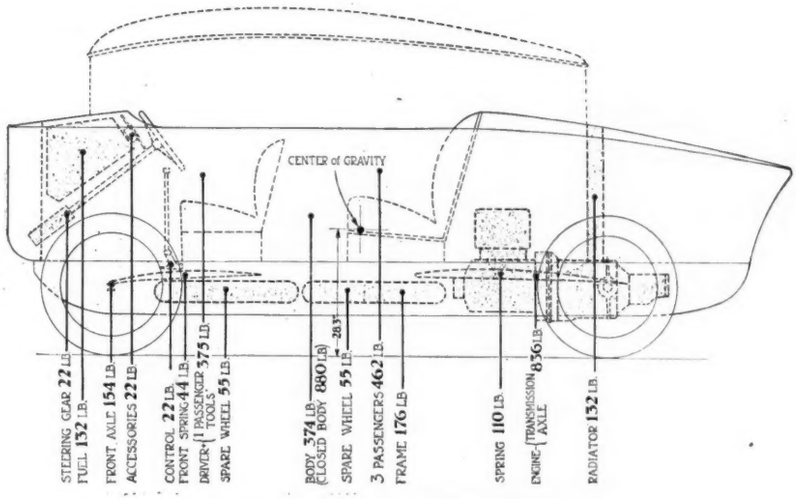


Fig. 11—Diagram of weight distribution

The body is of full streamline form, as shown by the photographs, and to obtain this form not only the spare wheels but also the battery and tool box are concealed within the body. No running board is provided, but instead there is a step, which, after having been used, folds up automatically so as to reduce the air resistance. When the door of the car is shut the step disappears in a space provided for it in the side of the body.

In order to minimize air resistance the head lamps are mounted in the front of the body, being held in place by light tension bolts.

A pure streamline body naturally cannot be fitted with the conventional mudguards. Dr. Rumpler uses for his car fin-shaped mudguards of elongated streamline section. Over each front wheel there are two mudguards, arranged one above the other. The larger of these carries at its forward end the built-in side lamp or parking lamp.

The car has a wheelbase of 114 in. and a track of 51 in. It is fitted with 880 x 120 mm. tires all around and is capable of a speed of 56 m.p.h. For long trips a detachable trunk can be fitted over the rear end of the body. The engine is said to be as accessible as in the standard car and the rear axle and transmission more so.

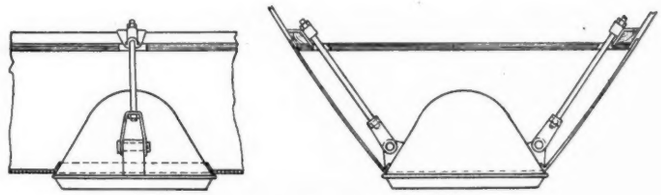


Fig. 12—Headlight mounting

The principal advantages claimed for this new design are the following: The air resistance is very low, on account of the streamlining of body, underpan and limousine top, as well as enclosed axles, springs, spare wheels and accessories. The mechanical efficiency is high, on account of the absence of a long propeller shaft, torque tube and universal joints (this increased efficiency is probably largely imaginary.—Editor). Comfortable riding and great stability in turning corners, owing to the low center of gravity, small unsprung weight, rational arrangement of seats and proper distribution of weight. The car raises little dust. Passengers are not annoyed by odors and gases from the engine. The driver has an absolutely clear view ahead in crowded traffic. The machine is light and is cheap to produce.

New Earl Car Is Larger Edition of Briscoe

(*Continued from page* 811)

tight joint. The top of the open car is provided with a low, clear vision light with French bevel plate glass. By dropping the floorboards below the top of the frame the seats are brought low to the ground, while still leaving them the usual height above the floorboards.

An interesting feature which is found on all models is the design of the ignition switch. It is mounted on the instrument board at the left of the steering column in a separate case within finger reach from the steering wheel. This makes it possible for the driver to control all of the lights on the car with the left hand, leaving the right hand to handle the steering wheel and center control. The headlamps are the new drum type and side lights are provided for parking. A rear view mirror above the windshield and an adjustable sun visor and car heater are included in the equipment for the closed models. The touring car comes in genuine leather upholstery and the sedan and brougham are trimmed in wool broadcloth. The door windows on the closed cars are operated by the new Dura crank type regulator and the interior hardware is of oxidized silver finish, with a blue enamel design. The road weight of the touring car without passengers is 2550 lb. and that of the sedan, 2800 lb.

The prices of the different models are as follows: Touring car, $1,285; sedan, $1,995; brougham, $1,995; roadster, $1,375; panel delivery, $1,160; screen delivery, $1,085.

THE small car bids fair to remain popular in England for at least another year, although a stabilization of industrial conditions will likely bring about a demand for heavier cars. The Manchester Guardian, in discussing the subject, says the small car, in addition to its relative cheapness, has been found entirely satisfactory to owners. They point to the fact that motoring has become a business and unless the business depression is removed it is unlikely that buyers will want to sink large sums in more expensive machines. However, the Guardian says, once a man becomes a real motorist the demand for more power is apparent.

British Tractor Trials Develop Interesting Engineering Features

Many farmers attended the exhibitions carried on over 500 acres of land. In addition to the official tests salesmen had opportunities to give demonstrations of their machines to the visitors. American-made machines received favorable comments and a number of new models were introduced.

By M. W. Bourdon

THE question as to whether there is justification in continuing the annual tractor trials—of which the third has, at the moment of writing, just been concluded near Shrewsbury, England—was answered most emphatically in the affirmative by all of the many interested parties on the spot who were interrogated. "Are you satisfied that the time, trouble and cost expended on such organized trials are worth while?" "Do they stimulate sales?" were among the questions put to numerous representatives of British makers, English distributers of imported machines and dealers, while some of the farmers present engaged in conversation promiscuously and casually were asked: "Does this sort of thing appeal to you as a practical and forceful demonstration of the advantages of tractors?" The answers were invariably "Yes."

The only individual heard to suggest that the 1921 British trials could well be the last for five years to come was a member of the staff of an agricultural journal.

Admittedly, the members of the industry who were questioned were only too well alive to the fact that most British farmers are holding tight to their pursestrings this year; in other words, tractor selling in England is now all work and no pay—or very little of the latter. But it is held that of the several ways and means of attempting to get the farmer interested in tractors, to show him what they will do, to enable him to make up his mind which type or size will suit him best, and eventually to make him a buyer, tractor trials run on the lines of those just finished in England are proving as successful as any.

Although the British trials were planned and organized solely by the Agricultural Section of the Society of Motor Manufacturers and Traders in 1919 and this year, and in 1920 in conjunction with the Royal Agricultural Society, the aim has been so to frame the rules and to impose such tests under impartial observation that the official reports issued after each event as to operating costs, work done, speed, etc., shall be above reproach. Further, to avoid the need for awaiting the final and full report before anything definite can be learned on such matters, the organizers this year placarded, at the administration offices on the ground, tabulated performance results immediately these were ready during the four days over which the trials were spread. These tables accompany this article.

Fig. 1—Side view of Renault chain tractor

Scene of the Trials

Plowing and cultivating were carried out this year on 26 fields widely spread in slightly undulating country, the total acreage available being approximately 500, with the largest field some 50 acres in extent. The character of the soil varied very appreciably, and, while there was none which could be described as really light or exceptionally heavy, the latter class was closely approached — "full three-four horse land," a local farmer termed it. And, what is more, this heavier land had been dried so hard on the surface during the remarkable drought, even now barely broken, that it was exaggeratingly referred to as resembling concrete. "No sane man would attempt to plow it in that state with horses," two farmers remarked to the writer. "If tractors can tackle that, they can tackle anything," said another.

The weather was dry during the trials, and the only case of insufficient adhesion observed occurred with a Renault chain-track machine (Fig. 1) doing six furrows at once on a piece of rising ground. This machine weighs 7270 lb., has a four-cylinder engine, 3.7 x 6.3-in. bore and stroke, and in the drawbar tests gave a sustained pull of 3620 lb., but with a drawbar horsepower of only 14.3. On the same field as this Renault, on the next plot, was the 45-hp. Case (5½ x 6¾ in.), hauling with ease two three-furrow plows of the same size, but set to a depth of 6 in., as compared with the Renault 5 in.

Scheme of the Trials

In previous British trials the machines have run only under official observation, which means that for quite 50 per cent of the period of the trials they were standing idle. But this year the idea was that every tractor should be at work all the time, so that no matter which day of the four allocated to plowing and cultivating the individual visitor should select to be on the ground, he

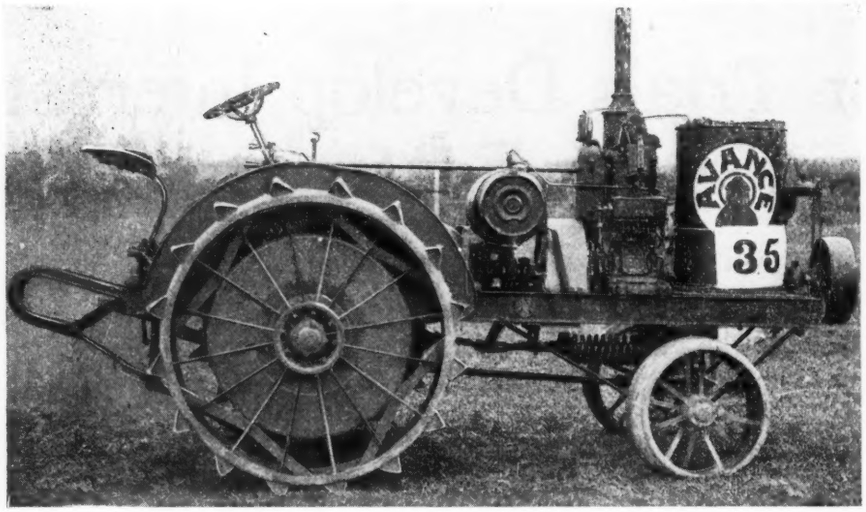


Fig. 2—Avance tractor with single cylinder semi-Diesel engine

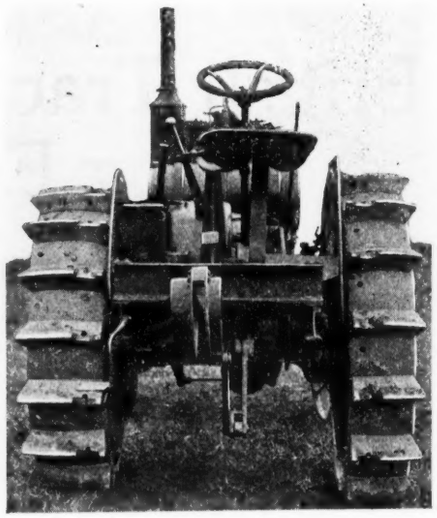


Fig. 3—Rear view of Avance

could, if he wished, see any one or all of them at work. When the machines were not undergoing one or other of the official tests they were demonstrating.

But this plan, though it was adhered to, did not work to full advantage, owing to the wide area covered by the fields available. Grass land is as much in evidence in the district as arable, and as a result it was a physical impossibility for any one man to visit every tractor and give each one due consideration. In future trials it is probable that it will be arranged that on one day all the tractors will be at work in one field or in two or three adjacent inclosures demonstrating pure and simple, the official tests being held on the other days wherever it may be convenient to have them. The day of the concentrated plowing will be advertised in advance, so that the farmer can select that day to visit the trials.

The Official Tests

With the new Watson drawbar dynamometers available more prolonged, more numerous and more precise tests could be made than in previous years, and certain factors which have previously been judged by mere opinion or casual measurement were brought out mechanically.

On the Saturday and Monday, preceding the four days on which the public was invited to attend, the machines were weighed and tests of maximum drawbar pull were made; in the latter the dynamometer was interposed in series with the drawbar coupling, while the machine under test hauled one, two, three or four other tractors, the drivers of which applied their brakes if required to impose the necessary load. The results of these tests were posted up on the ground immediately they were concluded (see Table I).

For four days the official plowing tests were conducted, a group of the machines being taken in hand each day until all had been dealt with. At other times they were demonstrating with plows and cultivators. Between whiles, too, each was submitted to a belt pulley test against a water dynamometer outfit rigged up on a heavy truck trailer hitched to a tree.

TABLE I

Tests of Maximum Drawbar Pull*

Tractor No.	Name	Speed in feet per minute	Pull to skid wheels, lb.	Sustained pull, lb.	Drawbar, hp.
1	Austin (kerosene)	215	2.000	1,820	11.4
3	Austin (gasoline)	206	1,920	1,720	10.6
5	Blackstone	125	4,060	3,470	13.2
6	20.4 hp. Case	161	2,090	1,710	8.4
8	28.4 hp. Case	167	3,660	2.680	13.6
10	45 hp. Case	152	5,080	4,080	18.8
11	Cletrac	225	2,940	2,650	18.0
13	Fiat	168	3,500	3,000	15.3
15	Fordson	175	1,440	1,235	7.35
17	Glasgow	166	2,900	2,450	12.3
18	28.8 hp. Hart Parr	225	3,110	1,725	16.7
19	17.8 hp. Hart Parr	175	2,150	1,730	8.4
20	International Junior	143	2,200	1,700	7.4
22	Lauson	141	3,160	2,400	10.3
23	Parrett	135	3,480	3,140	12.8
24	Peterboro	157	3,950	3.300	15.7
25	Renault (wheel)	150	2,400	2,040	9.3
26	Renault (chain track)	130	4.840	3,620	14.3
27	Samson	130	1,820	1,500	5.9
29	Saunderson	138	3,080	1,930	7.9
30	Titan	156	3,430	2,760	13.1
32	Twin City	175	3,000	2,470	13.1
33	British Wallis	181	2,750	2,560	14.0
35	Avance	86	2,700	2,450	6.4
36	Fowler	124	2,040	1,690	6.4
39	Service	60	480	410	.75

*In every case the drawbar pull was limited by adhesion and the nature of the ground, not by engine power.

TABLE II.—BELT TESTS

No.	Tractor	B.hp. at 2200 ft. per min. belt speed.	Max B. hp.
1	Austin (Ker)	23.25	23.75
2	Austin (Gas)	25.2	26.5
5	Blackstone	24.3	24.3
6	20.4 hp. Case	10.5	14.5
8	28.4 hp. Case	20	26.5
10	45 hp. Case	—	— (a)
11	Cletrac	20.5	23.1
13	Fiat	26.2	27.5
15	Fordson	16.0	21.5
17	Glasgow	17.5	17.5
18	28.8 hp. Hart Parr	28.75	30
19	17.8 hp. Hart Parr	17.5	17.5
20	International Junior	21.5	22.5
22	Lauson	28.0	28
23	Parrett	22.3	24.9
24	Peterboro	24	25
25	Renault (wh)	21.5	24
26	Renault (ch. tr.)	18	19.2
27	Samson	15.5	15.5
29	Saunderson	22	23.5
30	Titan	27	27
32	Twin City	25.25	29.25
33	Wallis	25	29.5
35	Avance	11.5	11.5
36	Fowler	19.25	20.0
39	Service	—	— (b)
40	Simar	—	6.25(c)

(a) Did not line up in time allowed.
(b) Belt pulley too narrow for test.
(c) Could not attain belt speed of 2200 ft. per min.

Fig. 4—The Simar Rotary tiller. This size, the smallest of three, represented the new system of tillage

Fig. 5—Service hand tractor at work

In the latter test the tractors, with their pulley shafts at right angles to the longitudinal center line of the machines, showed up to great advantage over those having the pulley shaft longitudinally arranged. The Parrett, for example, was called forward, got in position, had the belt mounted and was under test in approximately three minutes, where the Avance (a Swedish tractor), with its pulley at the front end of the longitudinal crankshaft (Figs. 2 and 3), was nearly half an hour before matters were satisfactorily arranged, with crowbars applied under the wheels to supplement engine power in maneuvering. The results of these belt tests were also posted up as they became available (see Table II).

Fuel Consumption, Speed and Drawbar Pull

Reverting to the plowing tests, an official observer was appointed to each machine (in each case he was the representative of another tractor maker) and it was his duty to take precise records of fuel and water consumption, the tanks and radiators being drained as a preliminary and the surplus from the replenishment measured at the conclusion of the test. Observers also recorded the area of the land plowed, duration and cause of each involuntary stop, minimum width of headland required for turning and number of attendants required for plowing. The recording dynamometers dealt with the drawbar pull, depth of furrow, distance covered and time occupied, and all these factors will be covered in the complete official report.

But, while to the technical mind the tabulated reports alone will be sufficient to enable the relative merits of the tractors' performances to be realized, the farmer would probably be mystified by them, and if he drew any conclusions at all might do an injustice to certain machines. He might look at the "fuel per acre" column of Table III only, and not realize that the varying resistance of the land and the difference in gradients of the fields might affect adversely or favorably the showing of the individual machine. It is the intention, therefore, that the final report shall make these matters clear, and the results will be made available in such form that direct comparisons can be made.

Coming back to the usefulness of the trials to the industry, there can be no question but that the average farmer was impressed by the thoroughness of the organization and tests apparent at Shrewsbury. The visitor could not fail to observe the signs indicating that a number of tractor makers have sufficient confidence in their machines to submit them for trial to a body comprising their own trade rivals and willing to have the results of the tests published broadcast.

Engineering Features at the Trials

Thirty-eight of the 40 machines entered by their makers or distributers were submitted for trial and these represented 27 models of 23 makes. Of these 23 makes only five had engines other than automobile types, viz., Blackstone and Saunderson (British), Avance (Swedish) and Titan and Hart Parr (American).

The Blackstone has a three-cylinder motor with low-tension ignition, pressure feed for fuel injected into the combustion chamber and compressed air for starting and diluting the charge. This design appeared to be impractical for an agricultural engine, with its high-pressure air container, valves and intricate and fragile valve gear. Its principal merit is that it self-starts on kerosene from cold. The machine is of the chain-track type, with certain peculiar but not pronouncedly advantageous features. It has appeared in three trials in succession and has been taken up by a combine of agricultural engineers.

The Saunderson engine is a two-cylinder plant made by De Dion, and the tractor itself has a good following among those who favor a heavier and slower speed motor than the automobile type. It does not make an impressive showing alongside the majority of other ma-

TABLE III.—PLOUGHING TESTS

No.	Name	Maximum Pull	Average Pull	Depth in.	Acres per hr.	Fuel pr. Acre pts.	Fuel used
1	Austin	1980	1720	5⅞	.49	24	Kero.
3	Austin	2440	1920	5½	.51	23	Gas.
5	Blackstone	1200	1070	7½	.62	15.7	Kero.
6	20.4 hp. Case	2060	1840	5¾	.46	18	Kero.
8	28.4 hp. Case	1780	1370	7¼	.82	19.8	Kero.
10	45 hp. Case (1)	3240	2485	6	1.11	23.6	Kero.
11	Cletrac	1900	1780	5¾	.59	26.5	Kero.
13	Fiat	2500	1650	7	.69	15.3	Kero.
15	Fordson	1320	1230	5½	.58	23.5	Kero.
17	Glasgow (2)	1870	1630	6	.54	18.8	Kero.
18	28.8 hp. Hart Parr	2590	2240	7¾	.81	22	Kero.
19	17.8 hp. Hart Parr (2)	1190	910	7	.45	30.2	Kero.
20	International Junior	2000	1320	5½	.53	24.6	Kero.
22	Lauson	1600	1210	5¼	.74	25.7	Gas.
23	Parrett	1880	1370	7	.62	17.8	Kero.
24	Peterboro	2680	1665	7	.77	24.5	Kero.
25	Renault (wh)	1460	1010	7½	.79	18	Gas.
26	Renault (ch. tr) (1)	3420	2740	5	.64	17.6	Gas.
27	Samson	1488	1072	5¾	.42	24.4	Kero.
29	Saunderson	1500	1030	7½	.67	20.6	Kero.
30	Titan	1700	1440	6½	.68	25.5	Kero.
32	Twin City	1645	1540	5¾	.71	27	Kero.
33	British Wallis	1800	1200	6¾	.78	19	Kero.
35	Avance	....	....	6¼	.37	26.2	Crude
36	Fowler (3)	....	....	6	.37	45.3	Gas.
39	Service (4)	....	....	6	.12	12.9	Gas.
40	Simar (4)	....	....	4	.19	25.6	Gas.

1. These machines hauled two 3-furrow plows.
2. These machines had plots of awkward shape causing loss at headlands.
3. Self-contained motor plow.
4. Garden cultivators, operator walking behind.

Fig. 6—A general view of the field tests with three machines at work

chines in the field, and in general efficiency it is probably lower. But it is a substantial general purpose tractor, with winding drum, and has a good name for durability after being on the market for at least ten years.

The Swedish Avance Machine

The Titan and Hart Parr are, of course, well known to readers of AUTOMOTIVE INDUSTRIES, but the Avance strikes a new note in tractor design. It has a semi-Diesel, single-cylinder engine of 6.85 x 7.32-in. bore and stroke, which, as usual with this type of engine, is reversible and eliminates the need for reverse gearing—though in maneuvering the waiting for the engine almost to stop before it can be reversed occupies more time than slipping in a reversing gear. There are also several unusual features in the general design. The ordinary type of radiator, for example, is displaced by a cylindrical cooler wherein the pumped water is caused to trickle over the surface of a coil of gauze, spiral in plan, while air is circulated through and around it by a fan at the front (Fig. 8).

Then, again, the Avance can be used either as a self-contained plow or as a tractor with separate implements, but the shares of the attached plow were soon found to be unsuited to the land where this machine was set to work, and it was therefore taken off and a two-furrow separate implement was hauled. The drawbar pull from this tractor is exerted through two long and heavy helical springs under the engine, and these springs are compressed unduly if the plowshares meet with an unusual obstacle in the soil—a tree root or big stone, for instance—and by means of coupling rods and levers the engine clutch is then disengaged, thus bringing the machine to a standstill and preventing damage to the plows.

The general design of the Avance does not strike one as being entirely practical. Its center of gravity is obviously too high and its front wheels unusually small in diameter. Incidentally, its rear wheels are of unequal size, that on the right being 54 in. in diameter as compared with the 48 in. of the other, in order to keep the engine approximately vertical when the right-hand wheels run in the furrow.

The desirability of using a semi-Diesel type engine in agricultural tractors is a matter of opinion. It has points in its favor and seems to appeal to those people who incline toward a slow-speed engine; at Shrewsbury the Avance ran on crude mineral oil in the tests and subsequently demonstrated with palm oil as a fuel. Its exhaust was by no means invisible with either, and it was inclined to misfire somewhat erratically even when pulling steadily under load—though, of course, this shortcoming is not a necessary accompaniment of the semi-Diesel system.

Simar Rotary Tiller

Another newcomer to British trials was the Simar Rotary Tiller, a Swiss production in which tines or hooks of round section spring steel are rotated and provide a fine tilth—resembling that resulting from the use of plow and harrows. It is claimed that an equally good seed bed is thus provided at one operation instead of three or more, and, while as a disturber of the soil the machine is remarkably efficient, this system of tillage does not meet with universal approval from agriculturists, though it is highly spoken of by some users; it does not bury the stubble and weeds as completely as a plow, but merely disturbs them, some being buried, while the remainder lie scattered about half in or out of the soil.

This type of machine is made in three sizes, the two largest being termed 25 hp. and 40 hp. respectively, and having three wheels, but the front one is merely a castor wheel, steering being accomplished by declutching one or other of the rear ones. These two machines are comparable with tractors or self-contained motor plows of similar power, but unfortunately they were not at Shrewsbury, the system being represented by the smallest type, which is hand-controlled and steered by its attendant walking behind (Fig. 4). It is a model intended for use on vegetable farms, orchards and other plantations where its narrow track (22-in. wheel centers, with a maximum of 28 in. of the rotary tiller drum) makes an appeal. It has a two-cylinder Vee engine of approximately 3¼ x 3¾-in. bore and stroke, and on medium land at the trials it steadily tackled a "furrow" of 28 x 8 in., a performance which demonstrated its superior efficiency in a mechanical sense to that of a plow, for obviously an engine developing but 7 hp. at 1200 r.p.m. would not suffice for a two-furrow, 14 x 8-in. normal plowing outfit. Wheel adhesion, incidentally, is quite remarkable, for it is enhanced by the fact that the tines assist to haul along the machine as a whole.

Another "hand" tractor at the trials was a single-cylinder outfit with a single-furrow plow attachment, the Service; but it was out of its element in big fields and heavy land, being, like the small Simar, intended for garden and plantation use in light soil.

No other new tractors were present and some of the old ones seen at previous trials were absent. Among the latter were certain machines of American manufacture—Moline, Chase, E. B. and G. O.—but the United States was represented by the following: Case (three

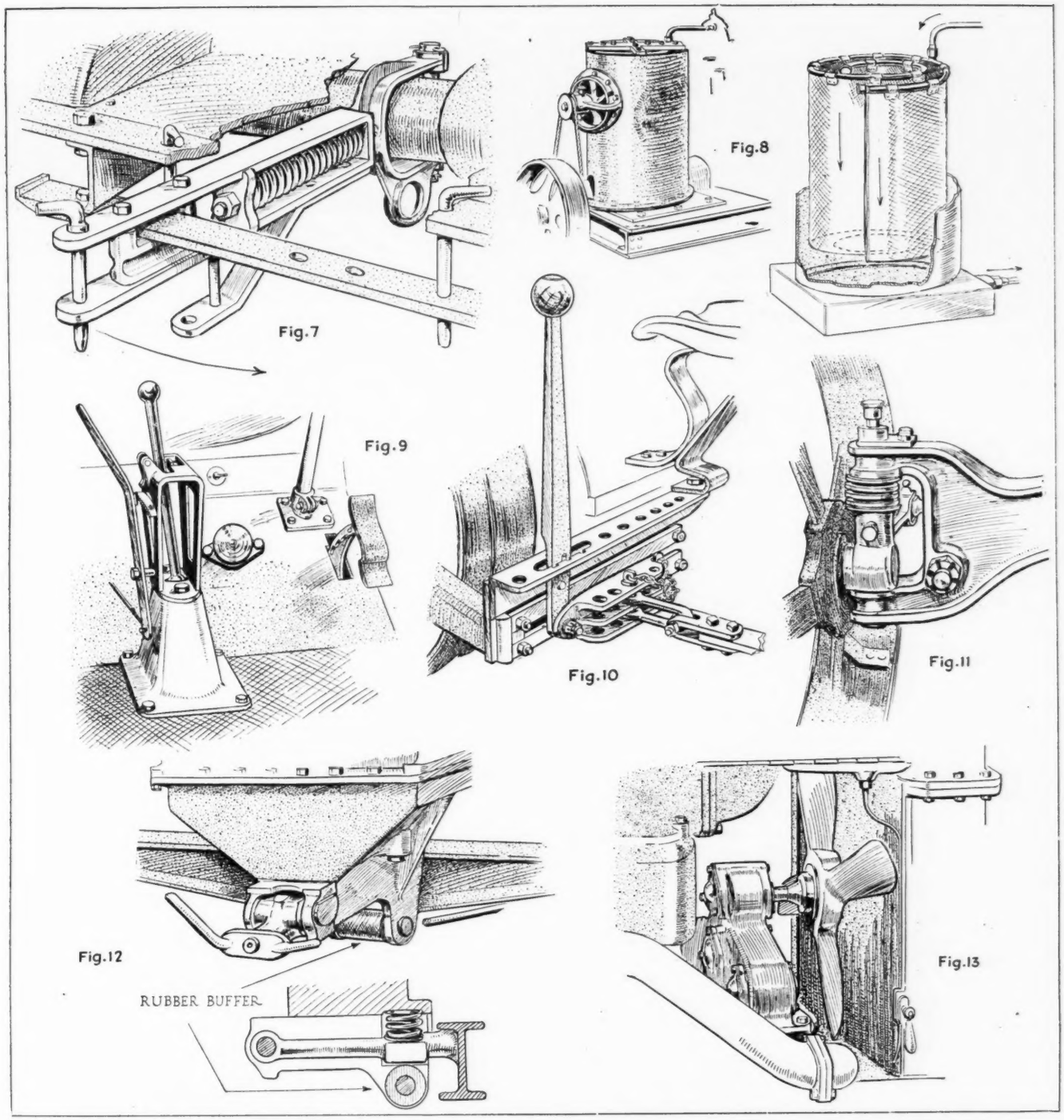


Fig. 7—Drawing shows the Saunderson shock absorbing drawbar coupling with provision for lateral adjustment. Fig. 8—Avance water cooler displacing usual type of radiator. Fig. 9—Peterboro controls. Note raised "gate" for spherically pivoted gear shift lever. Fig. 10—Glasgow adjustable drawbar. Fig. 11—Saunderson spring buffer for front swivel axles. Fig. 12—Austin flexible front suspension of power unit on axle. Fig. 13—Austin direct drive fan

models), Cletrac, Fordson, Hart Parr (two models), International Junior, Titan, Lauson, Parrett, Samson and Twin City, while the British Wallis also exemplified American design; entirely British machines were the Austin, Blackstone, Glasgow (Continental engine), Saunderson, Peterboro, Fowler (Waukeska engine) and Service. Fiat (Italy) and Renault (France) each had two machines at work.

As regards general engineering tendencies, there were few changes of note. Both gasoline and kerosene were used as fuel, and Austin had two machines running on the one and two on the other. The Austin vaporizing system for the heavier fuel consists merely of a combined inlet and exhaust manifold with a Zenith carbureter, the contact between inlet and exhaust branches being complete throughout their length alongside the cylinder block. This system appeared to serve quite efficiently, gave a clean exhaust, and in the tests of maximum drawbar pull the kerosene-fed machine actually showed better results than the other.

Only one three-wheeled tractor was present, the Glasgow, with its all-wheel drive. For some reason or other this machine has not made the headway in output and sales which was expected of it, but possibly this is accounted for to a certain extent by production delays not making it available in quantities until the slump

commenced. It is still looked upon, nevertheless, as a type which will survive, despite the gradual disappearance of other three-wheelers. Contrary to expectation, by the way, this tractor, notwithstanding its three driving wheels, was limited as to its drawbar pull by lack of adhesion, not by engine power. But in this case, as in many if not all the others, the soil was actually too dry to enable the machines to show up to best advantage. The field where the maximum drawbar pull tests were made was stubble on fairly light soil and kicked up almost as readily as road grit 6 in. deep; even the chain-track machines suffered in performance for this reason.

One of the Hart Parr tractors used a front axle extension to enable the right front wheel to run in the furrow while the other three ran on the unplowed land, and this arrangement seemed to appeal quite strongly to many of the farmers present. Those of the latter who work heavy land with a clay-like subsoil object strenuously to the two wheels on one side running in the furrow, because of the compression of the subsoil which then occurs, tending to cause the land to become waterlogged, especially when two-furrow plows are used. But they object, also, to running all wheels on the unplowed land, because of the need for the driver constantly to be on the alert for steering. Thus the Hart Parr arrangement appealed as a good compromise, causing but a small proportion of the weight to be imposed on the subsoil and providing something approaching a self-steering effect. The Cletrac self-steering arm also gained approval for a similar reason, but no British maker had any feature of this nature, and all the four-wheeled machines of home production ran with two wheels in the furrow.

Rate of Penetration in Case Hardening

IN the cementation process direct contact between the iron and the powdered charcoal is essential. According to Le Chatelier and Bonnerot no cementation takes place in the absence of any gases in a vacuum, while Guillet and Griffiths obtained some penetration in a vacuum when the charcoal was pressed against the iron. Iris Runge, who has been investigating the problem at Göttingen, believes with Giolitti and Astorri, that gases play an important part in the penetration, but that solid penetration is also possible. In order to study the rate of diffusion of carbon into iron, she had to work with carbonaceous gases. While Giolitti had in similar researches analyzed the successive layers of an iron wire heated in a carbonaceous gas, Iris Runge relies on the increase of the electric resistance of the wire and on microscopical examination. She makes the assumption that the increase in resistance will be proportional to the amount of carbon absorbed by the iron; the assumption is somewhat questionable, but seems justified by her experiments, especially considering that iron does not, under her experimental conditions, take up more than 1.5 per cent. of carbon at near 1000 deg. C.

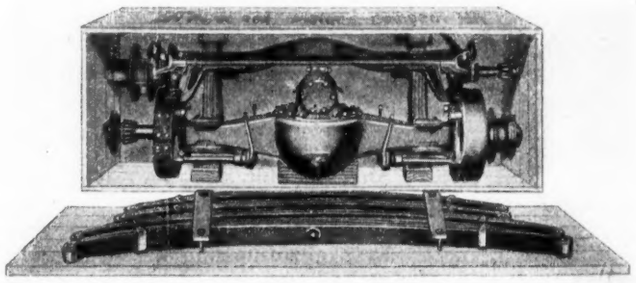
The wires used in the experiment were 0.5 cm. length, 50 cm. or 25 cm. long, wound to a spiral of 2.5 cm. length, and enclosed in an electric furnace. By copper leads, 2 mm. in diam., the wires were led to a Wheatstone bridge for resistance measurements accurate to 0.001 ohm., and taken every few minutes. The wires, mostly electrolytic iron, were first heated in a current of hydrogen or nitrogen until the furnace temperature and the resistance had become constant; this took about two hours, during which the resistance rose to about ten times its original value. The current of the respective gas was then turned on; the gases tried were: coal gas, as such or diluted with hydrogen or nitrogen; vapors of hexane, benzol, toluene, petroleum ether and methyl-alcohol, likewise diluted. The change in resistance observed would of course partly be a temperature effect. Sometimes a change in resistance was noticed, attributable to carbon; when there was a change, the wire would mostly be covered with loose sooty carbon; this was especially noticed with hexane, and was last noticeable with toluene. When there was no change in the resistance, little or no carbon would be found in the iron on subsequent examination. It was clear that the presence of hydrogen facilitated the penetration of carbon into iron, though the results were not very concordant. The rise of the resistance was generally rapid at first; within about forty minutes constant conditions would be attained. The absorption of 1 per cent. of carbon increased the resistance of the iron at 920 deg. C. by 5.7 per cent., at 830 deg. by 7 per cent., at 18 deg. by 40 per cent., the increase being reckoned on the corresponding temperature. The diffusion co-efficient at 930 deg. C. was $2 \times 10 = ^{i}$ sq. cm. per second, and with an active gas 0.6 mg. of carbon passed through 1 sq. cm. of iron surface in the first three minutes. There was no appreciable cementation below 700 deg., and the rate of cementation rapidly rose at higher temperature. The mixed crystals formed above 900 deg. consisted of cementite and pearlite.

Saving in Shipping Costs

TRANSPORTATION is one of the big factors that enters into the purchase price of a motor truck. Especially is this true of cars that are shipped for export. The Royal Rex Motors Co. of Chicago has designed all its truck models so that they can be knocked down and shipped in separate parts. The saving claimed by this method is well over 100 per cent on all shipments to foreign ports. The truck, once it reaches its destination, can be uncrated and assembled by two mechanics in four hours' time.

As an example company officials said the cost of shipping a truck from Chicago to Liverpool, under the old method, was $250.75, divided as follows: Chicago to New York, $58.75; New York to Liverpool, $192. Under the new method a saving of $155.75 is claimed. The cost from Chicago to New York was given as $47 and from New York to Liverpool, $48.

Shipments to other European ports and to South American and Pacific points were also shown to have been made with similar savings.



Crated for shipping

The Manufacture and Assembly of a Cork Insert Disk Clutch

A description of machining and assembly operations on Hudson and Essex clutches. Most of the parts used in the two clutches are identical and the two are assembled simultaneously in the same department.

By J. Edward Schipper

FOR about eleven years the Hudson Motor Car Co. has been using a multiple disk clutch with cork inserts running in oil. This clutch has proven so satisfactory during this length of time that it has undergone but little change. The clutch used in the Essex car is identical with that in the Hudson except that there are two less disks and four springs instead of eight.

A sectional view of the clutch is shown in Fig. 1. The clutch is housed in the flywheel and inclosed by a clutch cover. The drive is transmitted from the flywheel to the driving set of disks by five pins which are riveted to the clutch cover. These pins pilot or seat in holes in the flywheel. From the driving disks, which are provided with cork inserts, the torque is transmitted to the driven disks by frictional contact. Frictional contact is maintained by four clutch springs in the Essex and eight clutch springs in the Hudson, which squeeze the disks together between the clutch drum, which carries the driven disks, and the pressure plate. The clutch is released by forcing pressure plate back against the spring pressure. The actual disengagement of the disks is effected by separator springs placed between them.

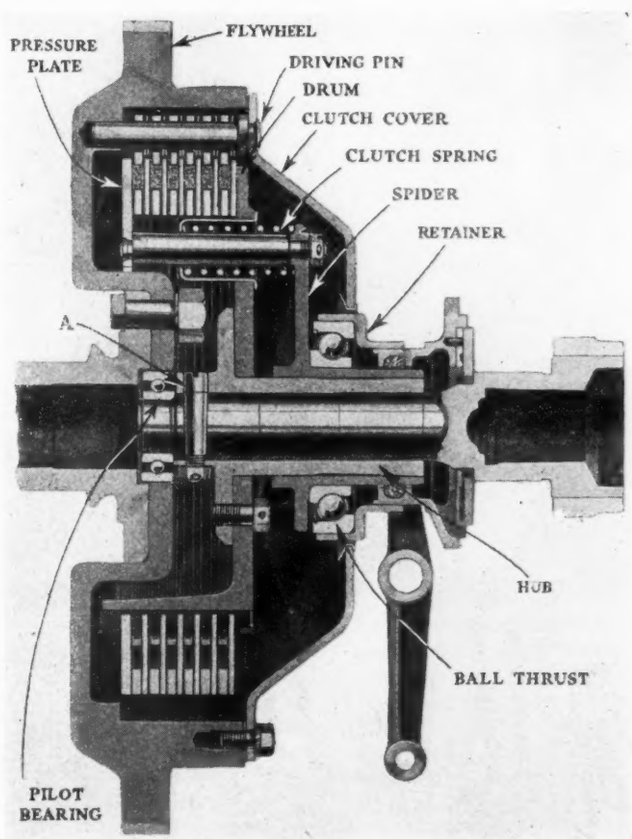


Fig. 1—Sectional view showing construction of Hudson clutch

The principal units in this clutch, which is manufactured almost entirely in the Hudson plant, are the hub, the cover, pressure plate, disks and spider. The clutch hub is a drop forging, the blank being in solid form roughly flanged to shape. The machining operations on this part are not unusual, consisting of simply drilling the center bore on a Foote-Burt radial and reaming the hole on the same machine, Fig. 2. The hole which is 1¼ in. diameter is then broached to size on a Lapointe broacher. A keyway is also broached in this hole on the same machine. The hub is turned and faced on a Fay automatic lathe capable of turning 12 hubs per hr. These are turned down to a diameter of 1.8125 in. nominally, which leaves .020 in. for finish grinding. The work is held on an arbor which is pressed into the hub before it is mounted in the Fay lathe, this arbor providing the centers for the operations.

After the 1¼-in. center hole is chamfered, the holes are drilled for the tapered pins which fasten the hub to the transmission shaft. This is the pin shown at A in the section of the clutch, Fig. 1. Clearance for the nut which is screwed on the end of this pin is milled on a LeBlanc miller, after which eight 21/64 in. holes are drilled in the hub flange. Location for this drilling is from the keyway in the broached hole through the center. Two draw holes are then drilled in the flange for puller screws used in removing the clutch. The eight holes in the flange are then chamfered and all ten holes are tapped on a Garvin tapper. The hub is then ground to size and face flanged. This grinding is done on a Norton grinder, the hub being pressed on an arbor and centered, Fig. 3. The final operation on the hub is filing to remove any burr from the keyway.

The clutch cover is a stamping, the only machine operation necessary on this being to grind off the face on a Blanchard grinder, Fig. 4. This assures a good seating contact with the face of the flywheel against which this cover bolts.

The clutch plates are stampings, the plates containing the cork insert having the holes punched in the plates. The plates which carry the cork inserts are ground on both sides. The pressure plate is only ground on one side, as it has contact only on the side which is drawn up against the contacting disk. The grinding of the plates is done on Blanchard grinders, the plates being held by magnetic chucks. The punched holes in the disks into which the corks are placed are counter-sunk on a Sipp

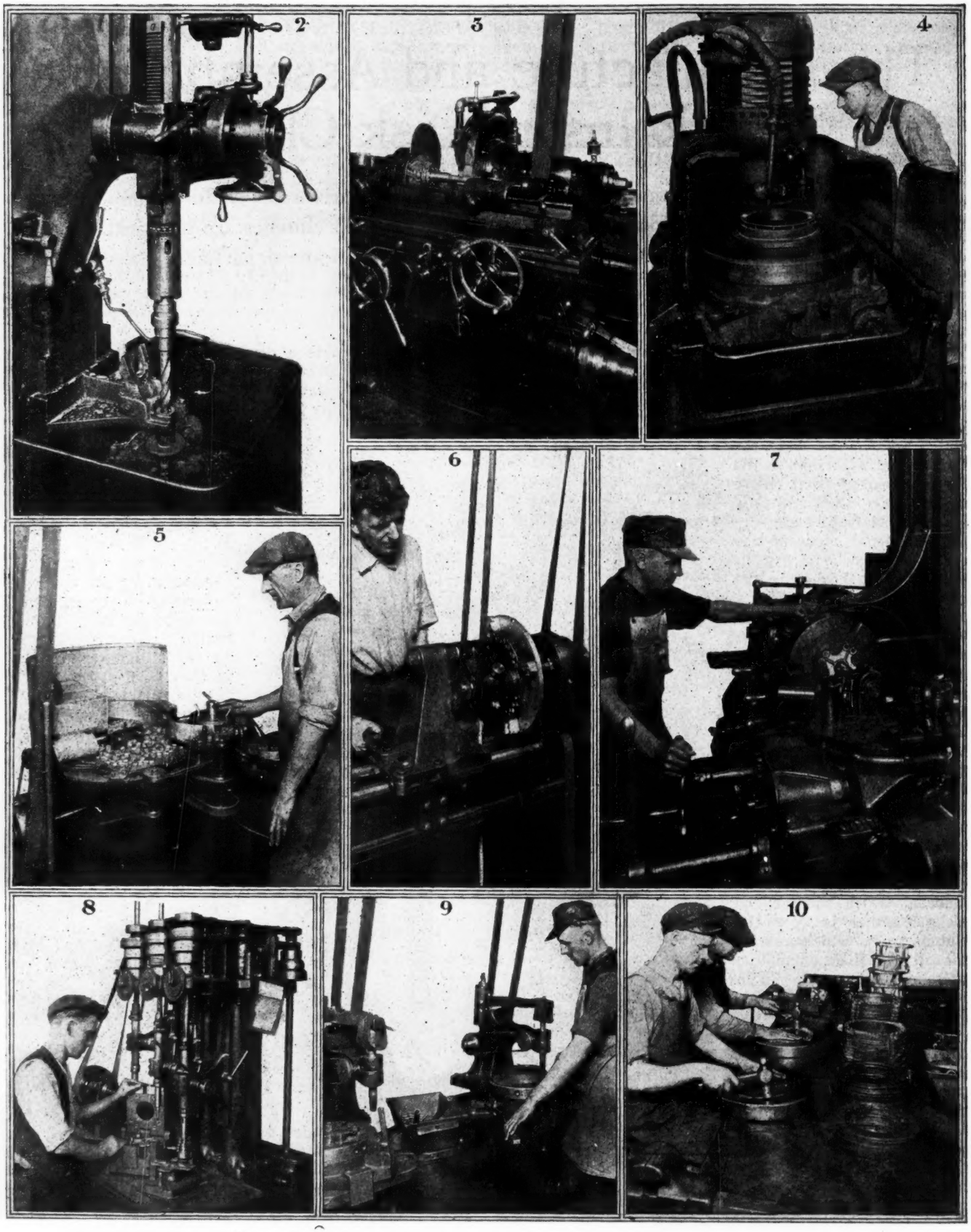


Fig. 2—The center bore on the clutch hub is drilled and reamed on a Foote-Burt radial. Fig. 3—Finish grinding outside diameter of clutch hub on Norton grinding machine. Work is held on arbor pressed into hub. Fig. 4—Facing the clutch cover on a Blanchard grinder to assure a good seating contact against the face of the flywheel. Fig. 5—Automatic machine for inserting the corks in the driving disks for the Hudson-Essex clutches. Fig. 6—Straddle slicing machine which slices off ends of corks on both sides of disks, leaving slight amount projecting for frictional contact. Fig. 7—Boring and reaming clutch spider on Pratt & Whitney machine. Fig. 8—Three-spindle Sipp used for drilling and spot-facing stud holes in clutch spider. Fig. 9—Automatic riveter which rivets the driving pins to the clutch cover. Fig. 10—Straightening clutch plates to within .010 in. limit by peening.

Fig. 11—Starting clutch assembly on four pins mounted in assembling fixture. Fig. 12—Clutch about one-half assembled, showing the pressure plate, some of the disks and the separator and silencing springs between them. Fig. 13—Final operation in the clutch assembly, putting the nuts on the ends of the pressure plate studs. These nuts are locked by means of cotter pins

radial so that, in assembling, the corks will not be damaged in pressing them into the holes. The plates are then straightened by hand, this being a peening operation. The corks are put in the disks on an automatic machine which has been specially designed and made by the Hudson company, Fig. 5. The machine has a centrifugal hopper which throws the corks into a feeding slot from which they are forced into the proper holes by means of the feed punch.

The clutch disk is rotated on an automatic indexing machine which always brings a hole in front of the punch in the proper position to fit the cork in place. The corks are soaked in soap and water for a considerable length of time before they are fed into the machine. The final operation on the cork disks is to pass them through a straddle slicing machine, Fig. 6, which slices off the corks on both sides of the disks at the same time. The slicing machine leaves a slight amount of cork projecting on each side of the disk so that even when the clutch is engaged under pressure, there is no metal to metal contact.

The clutch spider is a malleable casting. This spider carries the studs and also acts as the clutch spring retainer. Disengagement of the clutch is secured by moving this spider inward, which, in turn, depresses the clutch springs, allowing the plates to become free to disengage. The spider is bored and reamed on a Pratt & Whitney, the center hole being reamed to 1.8125 in. in diameter, Fig. 7. The location for this is from the outside diameter. This same machine also faces the bosses for the studs. A Warner & Swasey turns the outside diameter, location for this being from the inside bore by means of a roller pilot. The holes for the studs are drilled and then spot-faced on both sides. This work is handled by a three-spindle Sipp, Fig. 8. Grinding the hub to an outside diameter of 2.163 in. on a Norton grinder finishes the operations on this part.

The drum, being die-cast aluminum, requires no machining, except a small operation which is described under assembly.

The cast iron clutch retainer requires some work on a Pratt & Whitney machine consisting of facing off the ends and boring, reaming, facing and turning the outside diameter. The throw-out pad on the retainer is also milled. The clutch studs are ground to .482 in. with a tolerance of plus or minus .0005 in. on a Norton grinder.

Before the clutch reaches the final assembly bench, there are a number of sub-assemblies made. The annular throw-out bearing is pressed into the retainer and the clutch spider is pressed into the bearing. After this has been done, the spider is finish reamed by hand to secure an accurate inner bore. The sub-assembly is then given a gasoline wash. The oil ring is assembled to the clutch cover, this ring being spun into the cover. The four driving pins which transmit the drive from the flywheel to the driving disks are riveted on the clutch cover on an automatic riveter, Fig. 9. The four pins which transmit the thrust of the clutch spider to the pressure plate on disengaging the clutch are riveted to the pressure plate on the automatic riveter and the pins and plate straightened on a fixture which is so arranged that the pins drop into holes on the fixture, permitting of proper alignment. The pressure plate is polished against emery cloth on a lathe.

The clutch drum, which is an aluminum die casting, is reamed to properly size the center hole and then broached. The jaw liners, which take the wear instead of the aluminum drum itself, are assembled in place and the drum is assembled to the hub with six bolts held in place by locking wire. Before assembly, all of the disks are straightened by peening operations to within .010 in. limits, Fig. 10.

In the final assembly, the clutch is built up on a fixture. The four pins are set up in the fixture and the pressure plate put in place, Fig. 11. The disks are then placed on with the silencing and separator spring placed between them, the disks being placed alternately, first, cork insert and then plain, Fig. 12. The drum and hub assembly is then put in place and the four clutch spring retainers inserted. These are cup shaped stampings which fit into the drum. The four clutch springs for the Essex clutch are then inserted and the spider assembly put over the springs. By means of a nut on the fixture, the spider assembly is

screwed down forcing the springs into the spring retainer. The nuts are then put on the pressure plate studs, Fig. 13, which project through the center of the springs into the spider, and the cotter keys are placed in the castellated nuts. The four clutch cover springs and the four spacers are then put on and the cover is put over the assembly.

It takes a good operator about 6 min. to assemble an Essex clutch and 8 min. for a Hudson clutch. The Hudson clutch takes longer on account of the additional disks and springs. The gang-work system is used on the assembly of these clutches, and owing to the similarity of the work, the same gang can work interchangeably on Essex or Hudson clutches.

Two clutches for two quite different cars come through the same plant and are assembled at the same bench by the same men. It will be asked, no doubt, whether or not this is a good policy from a manufacturing standpoint. This same principle is carried throughout the Hudson and Essex plant, which is combined into one unit at the present time.

It will be remembered that originally the Essex was to have been manufactured in a separate plant, and when normal times are again reached and steady production possible, this may be done. At the present time, however, the fluctuating manufacturing schedules to which all car manufacturers have been subjected have made this plan of the Hudson and Essex company one possessing some great advantages. In the first place, it has been possible, by alternating the work on the Hudson and Essex through some of the departments where fluctuating schedules had the greatest effect, to maintain a steadiness in the personnel as well as in the machine work which would otherwise have been impossible. This is particularly true in a department such as this clutch department where the difference between the two clutches is so slight. The man who is accustomed to the Hudson clutch has no trouble whatever in doing other work on an Essex clutch, in the few minor instances where the two clutches are different. Even in the assembly work, it would be perfectly possible for a man to assemble first a Hudson clutch and then an Essex clutch without in any way becoming confused or making errors.

In the layout of the clutch department, the manufacturing operations are grouped around the assembly and the entire department is featured by the small amount of movement of parts necessary in completing the work. A square in the manufacturing establishment, roughly, 75 ft. each side, would be nearly sufficient to inclose the entire manufacturing and assembly department for both the Hudson and Essex clutch. This compactness and resultant economy in overhead on the two clutches has advantages which are apparent on the surface.

Requirements for Successful Piston Castings

THERE are a number of kinks in the manufacture of successful pistons which a specialist in this line of work must soon come to recognize. As specialists in this line of work the McLough Foundry has found that in order to get the best results in the machine shop and to minimize losses there are some definite precautions to take. The following ten requirements are important from the standpoint of successful pistons:

1. Pistons must be soft iron, easily machined.
2. Must be close grained and tight.
3. Must be free from hard spots.
4. Must be free from cracks.
5. Must be free from sand holes.
6. Must be free from sulphur holes.
7. Must be free from cold shut.
8. Must be free from shrink.
9. Must be perfectly round and balanced.
10. Must be strong and tough.

The answers to these ten problems are as follows:

1. A high silicon iron is necessary with correct proportion of sulphur and other ingredients.

2. A mixture of steel is used.

3. The silicon must be not too high and steel and manganese in perfect control.

4. Spiegeleisen and manganese help to strengthen the iron and prevent cracks.

5. Clean molding and perfect cores are necessary.

6. Sulphur content should be low.

7. Hot iron and perfectly tempered sand are necessary.

8. Shrink can be controlled by proper mixture of iron.

9. High silicon is necessary in producing machinable iron. Low sulphur is necessary, as too much sulphur is the worst enemy in the foundry, as it causes hard castings, holes and sponginess. This content should always be under perfect control and closely watched.

Manganese is a natural scavenger and has a natural affinity for sulphur, therefore should be kept well up toward 1 per cent, as it also toughens the iron. Steel is necessary to close the grain of iron, keeping it tight. Up to a certain per cent steel is a softener.

10. The chemical analysis for pistons should analyze between the following percentages:

Silicon, 1.80 to 2.25; manganese, .60 to .80; phosphorus, .40 to .45; sulphur, under .09.

This can be obtained from mixture of following iron:

Pickands Mather Co., Charcoal Iron Pile No. 1—Silicon, 2.90; manganese, .67; phosphorus, .185; sulphur, .03.

M. A. Hanna Co., Silvery Iron Pile No. 2—Silicon, 8.30; manganese, .34; phosphorus, .264; sulphur, .02.

Rogers Brown Co., Charcoal Iron Pile No. 3—Silicon, 2.26; manganese, .59; phosphorus, .178; sulphur, .014.

Mathew Addy, Princess Pile No. 4—Silicon, 1.86; manganese, .832; phosphorus, .438; sulphur, .019.

Spiegeleisen—Silicon, .75; manganese, 18 to 22 per cent; phosphorus, 10; sulphur.

Automobile Scrap (average analysis)—Silicon, 2.00; manganese, .50; phosphorus, .45; sulphur, .12, dangerous.

Steel Scrap (average analysis)—Silicon; manganese, .50; phosphorus, .08; sulphur, .08. Furnace charge of 1500 lb.

Pile 1	300 lb.
Pile 2	150 lb.
Pile 4	150 lb.
Automobile Scrap	750 lb.
Steel Scrap	150 lb.
Spiegeleisen	25 lb.
Total	1525 lb.

If this mixture is closely adhered to, successful pistons will result, with a foundry loss of about 5 per cent.

Great care should be placed in the making of cores and of molding to keep losses down.

THE recent action of the National Automobile Chamber of Commerce in declaring a pintle hook to be part of the standard equipment of a truck or part of a complete truck, recalls the fact that the S. A. E. has a recommended practice on trailer hitches and this embodies a pintle hook for trucks.

Motor Bus and Motor Coach Transportation in the British Isles

Automotive vehicles are successfully competing with the British railroads and tramways in both short and long haul passenger traffic. Facts and figures gained in a study of these systems made by an American railway engineer make it apparent that our vehicle manufacturers can profitably investigate the domestic market for large passenger-carrying vehicles.

By Walter Jackson*

THE recent appearance in Great Britain of Volume 1 of "T. B. R." (Travel by Road) marked the fact that the motor bus and motor coach have attained such importance as to require a national monthly route and time-table guide. From now on every newsstand in the United Kingdom will apprise the public that they can travel from almost anywhere to almost anywhere via tire instead of rail. The first issue of the guide lists 1876 routes; this is far from complete, as a number of important operators have not yet co-operated in its compilation.

The motor bus and sightseeing car of Great Britain have a long and respectable lineage. The earlier coming of good roads there and the fact that many localities were not so abundantly served with rail service as here led to automotive passenger transport at a time when we had no thought of applying gasoline to public utility vehicles. Of great importance in the evolution of high-grade designs was the fact that the development was in the hands of companies doing business with specifically public utility vehicles, and not in the hands of individual jitney operators, ready to run anything that will move.

THERE is much to be learned from the British regarding motor bus and motor coach transportation. Buses are extensively used in a few American cities, but our largest system is far smaller than the London system. We have many interurban bus routes, but no connected system with provision for advance booking which compares with that in England, Scotland and Wales. There are lessons here which should be investigated by American manufacturers. Much valuable information in this regard is contained in this article by an American railway engineer who would hardly be expected to be prejudiced in favor of automotive transportation.

The strongest impulse to turn out an economical, reliable motor bus was furnished by the tempting traffic prize of London. Following the days of the horse bus a great variety of types were tried by a large number of competing companies. To-day one concern, the London General Omnibus Company, operates by far the greatest part of the buses used and the remainder is supplied by companies with which the L. G. O. has friendly agreements.

A 3000-Bus Concern

So many erroneous statements have appeared about the importance of motor buses in the London transport scheme that it may be well here to summarize the position as it really is:

Taking relative use first, we find that in the year 1919, according to figures submitted to Parliament by the Advisory Committee on London Traffic, there were carried 659,000,000 passengers on local underground and other intra-city railroads, 861,000,000 passengers on motor buses and 1,053,000,000 on street railways. There were also carried 468,000,000 passengers (estimated) on the suburban lines of the trunk line railroads entering London. From this it will be seen that the motor bus stood ahead of the local underground lines, but not of the tramways. A cause of confusion has been that the returns of the great London Traffic Combine (underground, bus and some suburban tramways) under the direction of Lord Ashfield have been mistaken for a return of all London traffic. In the case of the Combine, it is a fact that of the 1,171,701,868 passengers carried in 1920 (exclusive of street railways), 767,953,649 were transported on motor buses. When we take the associated bus routes into consideration, it is safe to say that London's buses now carry about one billion passengers a year. This should be honor enough!

Second to consider is the fact that London's layout has been exceptionally stimulating for motor bus operation. Because of many narrow and winding streets, the street railway is almost completely shut off from the old cities of Westminster and London, which are the richest sources of traffic. In this area the buses have no competition except from underground railways under the same management. Since the buses, as a traffic proposition, could not very well confine themselves to dropping or taking on passengers at the boundaries of the business and shopping area, the routes have been extended from year to year, until to-day they not only traverse every part of London but go well beyond it. In a number of instances the bus route extends only from the rapid transit terminal outward, but the passenger usually can go in town all the way by bus if he cares to transfer to another route. Many patrons use the bus for the short rides to and from underground stations,

*Consulting electric railway engineer, formerly editor the *Electric Railway Journal*.

a species of traffic which is encouraged by the use of fares graduated according to distance traveled.

The operations of London bus companies range all the way from the short-haul pick-up service in the congested district to all-day sightseeing country runs with guide and meals included. At present some 2700 motor buses a day are in daily operation, the maximum being reached on Saturday and Sunday. An important change in capacity has been necessitated by the great wage increases of recent years. The 34-seat, Type B bus is being superseded by the 46-seat Type K, of which more than 1000 have been built, and a still bigger bus, the 54-seat, Type S, is in use on certain routes—265 having been put in use in July, 1921. All London buses are made by the allied Associated Equipment Company (A. E. C.).

While the term "supplementary" is hardly adequate to describe a transport system of L. G. O. dimensions, it would be proper to refer to it as being frequently an "alternative" method of transportation. Thus, since no standing is permitted in the new "K" and "S" buses, there are times when a certain amount of traffic is diverted to the same management's underground lines, or in competitive districts the street car will be used. Also, in inclement weather many bus-riders failing to obtain inside seats will ride all or most of the way underground or by street car. The fact that other British cities operating buses lack alternative transport accounts for the general preference of the provinces for single-deck buses.

Accompanying cuts show the character of stop signs which tell the public not only where the buses stop but also what routes go by a given stopping point.

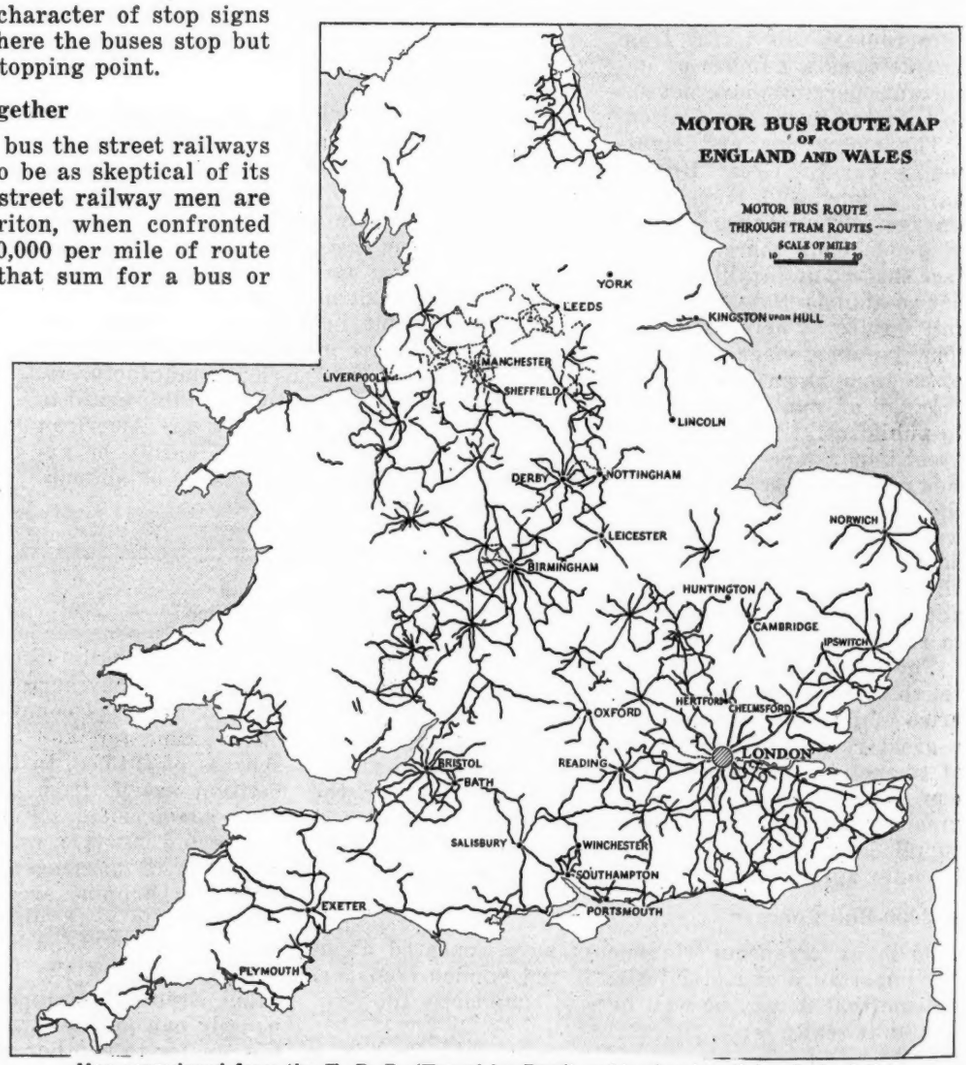
Tying Street Railway and Bus Together

In the early days of the motor bus the street railways of Great Britain were inclined to be as skeptical of its possibilities as many American street railway men are to-day. But the hard-headed Briton, when confronted by the problem of spending $100,000 per mile of route via the trackway, or one-tenth that sum for a bus or two to handle the traffic, did not hesitate long. Hence we find that almost all of the municipal tramways that are not running motor buses yet are petitioning Parliament for the right to do so. If it were not for the expense and time involved in getting these permits, the municipal railways of Great Britain would have much more extended bus services than at present. In some cases they have suffered the chagrin of seeing private companies put on motor bus services at will, even in competition with themselves, while they have been tied hand and foot by limitations placed on what the British call "municipal trading" and what we call "municipal ownership."

Of the installations studied on the latest trip made by the writer, Sheffield and Edinburgh were exceptionally interesting. Sheffield is the largest municipal combination of motor buses and trams; Edinburgh, with still more buses, bought within two years, presents a novelty in that the present bus service is the successor to cable lines pending possible electrification.

The Sheffield installation, comprising 42 buses at the time of the writer's visit in June, 1921, is used primarily for extensions of the original trolley routes. This service has become so important that to-day the route mileage of the buses actually exceeds that of the street railways, the relative figures being 60 against 40. It will be understood, of course, that the greatest density of traffic is on the street railways, since these run through the densely built-up sections of the city. Thus it is that the buses carried approximately 5,500,000 passengers while the cars carried approximately 152,000,000 in the fiscal year ended March 25, 1920. It will interest the reader to learn that depreciation is on a seven-year basis, which corresponds, roughly, to 150,000 miles' life. As a matter of fact, the first buses were sold at public auction after seven to eight years' service.

Fares are higher on the bus routes to compensate for higher operating cost and thinner traffic. The rate per mile is 1¾ pence, or slightly over 3 cents per mile, whereas the car fares are 1 penny (2 cents) per mile and 2 pence (4 cents) for the entire route. Bus passengers in Sheffield are usually transfer passengers—that is to say, they must use both car and bus in making the trip. Other British operators prefer to cater to the building up of direct through service. This is done by charging



Map reproduced from the T. B. R. (Travel by Road) guide showing the extent of the motor coach routes which form a network covering most of England, Scotland and Wales

Signs used in London to indicate the stopping points for buses which follow various routes

an excess rate wherever a street car is available, so that the city passenger is kept off of vehicles intended for the suburbanite.

A certain amount of Sheffield bus traffic also comes from people taking short rides to and from the steam suburban stations.

The relative fields of the motor bus and street car have been studied very carefully by A. R. Fearnley, general manager, Sheffield Corporation Tramways. In his paper before the 1919 convention of the Municipal Tramways' Association he showed that, despite the greater cost per seat of the bus, it was the most suitable vehicle for: (1) Connecting up cross-town routes; (2) relieving congested traffic by diverting part of it along other routes; (3) connecting up villages and rural districts.

The introduction of the motor bus as a part of Edinburgh's transport system came about through the taking over in 1919 of the antiquated cable system by the city of Edinburgh. Owing to the extremely high cost of new track and electric power facilities, R. Stuart Pilcher, general manager, recommended that certain of the northern routes be turned over to motor bus operation, pending the working out of electrification costs, etc. As the result of the experience gained with this service, especially in increase of traffic, the management has gained a clearer idea of the advantages and limitations of the motor bus. In his report of April 2, 1921, to the Council, Mr. Pilcher said:

"The limited accommodation of the bus is its chief disability. The bus cannot lift the crowds of people in emergency such as is done by a tramway car. On the other hand, it has the advantage of mobility and speed and of never being subject to the complete blockage of a route. It is rather strange that the bus, notwithstanding its restricted space and size, and sometimes congested condition, appears to receive a preference."

Further statements by Mr. Pilcher show that the introduction of motor buses lead to an increase in traffic as compared with the cable lines. Thus for the 11 weeks' period, January 8-March 19, 1920, the cars on one route carried 990,314 passengers, but in the same period of 1921 the buses carried 1,102,761. This is not all, however, for the earnings per mile due to higher fares and greater density rose from 21.8 pence (43.6 cents) to 30.6 pence (61.2 cents), an increase of 17.6 cents per mile operated. In a general way it may be stated that the tendency of the bus has been to more than offset its higher running costs by its higher earning ability.

By the end of the fiscal year ended May 15, 1921, a total of 71 single-deck, 32-seat buses of A. E. C. and Leyland types were in service, carrying 10,158,810 passengers on eight regular routes, 1.5 to 6.5 miles long, and in various special services. The Edinburgh system also conducts char-a-banc service, few cities in the world having more attractions for the sightseer. Nine of the sightseeing cars seat 28 and six seat 32 passengers.

It must not be supposed that the rapid development of motor bus service in Edinburgh is due to exceptionally favorable conditions. On the contrary, there are many steep grades in this hilly city and the standard paving is of granite block. There are points—such as vibration—in which the service is open to improvement, as Mr. Pilcher has mentioned in his reports, but the flexibility and higher speed of bus service in Edinburgh have more than outweighed these difficulties.

In London the passenger has the option of underground railways and inclosed top-deck cars if the weather becomes too unpleasant. Such an alternative is not presented at Edinburgh. However, as the present standard capacity of 32 seats is rather low for two-men operation, the management is trying out a side-entrance bus which seats 42 passengers.

Edinburgh is the center of a great automotive service conducted to outlying points by the Scottish Motor Traction Company.

126-Mile Overland Bus Service

Not satisfied with its triumphs in city and suburban work, the motor bus has been reaching out ever further afield to give either new or more frequent service to the country districts and to tie together places, 50, 100 or more miles apart. The largest of these undertakings is that of the Birmingham & Midland Motor Omnibus Company, Ltd., which operates more than 200 buses of the Tilling-Stevens gas-electric-drive type. There are also some double-deck buses in use. A significant fact is that this company is affiliated with the British Electric Traction Company, which was quick to recognize where motor bus operation is advantageous, and which now has a large number of installations, either in coordination with its tramways or entirely separate.

The Birmingham & Midland originally included a motor bus service in the city of Birmingham, but in 1914 the city of Birmingham took over the city buses and these are now a part of the local street railway and motor bus system. The number of routes exceed 100.

The variety of services given varies from the short-headway operation required in the suburban districts of a great city like Birmingham to the once-a-day run to a distant terminal. The most interesting example of the latter is that to Llandudno, Wales, a distance of 126 miles. This bus leaves Birmingham at 9.30 a. m. and, after making half a dozen intermediate stops, is in Llandudno by 6.10 p. m. Better running time than this is possible, but it has been found from experience that on long runs passengers appreciate the opportunity of stretching their legs. It is not desirable to tire patrons by making them sit in one place for four to five hours. A running speed of 30 miles an hour is entirely practicable on these trips.

The motor bus company does not pretend to compete with the railway in speed, but it gets a lot of business because so many people want to travel by road. However, the rates themselves compare favorably with the third-class charges on the railway. For example, the railway rate between Llandudno and Birmingham is 17 shillings 8.5 pence, while the bus fare is 16 shillings. So, too, the railway charges 16 shillings 2.5 pence third-class to Weston, 108 miles, whereas the bus rate is only 15 shillings. The business man may value his time highly, but there seem to be many more people who put comfort, cheapness and novelty ahead of time-saving; and that is why the long-haul bus prospers. Special rates are made for children, the concession usually being one-half the adult fare, except on holidays.

Passengers are permitted to take parcels up to 21 lb. in weight without extra charge; otherwise they are urged to ship heavier baggage via the company's combination of street railway and motor vans, said to be the only one of its kind in Great Britain and giving very largely a door-to-door service.

Unlike many motor coach operators, this company does not sell round-trip tickets. This matter of getting the return fare is left to booking agents at the terminals, who get a commission on sales. One reason for this policy is to avoid selling the same seat twice. In the case of the long runs it would be worth while to use the telephone or telegraph to avoid overlapping.

A pretty example of the ability of the motor bus to meet special situations is afforded by the policy of this company with regard to the Shakespeare summer festival held at Stratford-on-Avon. During this period the travel to and from Stratford is greatly increased, particularly by tourists and vacationists who want to enjoy the scenic beauties of Warwickshire, Worcestershire, etc., coming and going. To encourage this traffic the company is prepared to run special buses at ordinary round-trip fares between various outlying cities and Stratford for parties wishing to attend afternoon or evening performances. The only condition is that 25 passenger fares be guaranteed. Thus, people of the simplest means may enjoy the exclusiveness of the millionaire.

Ample care is given to publicity. Maps of the routes are sold for a penny and complete time-table with map for threepence, both through conductors. For sixpence the person interested in the beauty spots and famous places of the district can secure a handsomely illustrated booklet entitled "The King's Highway by Midland Red Motor Bus." The brilliant red coloring of these buses is in itself a good advertisement. A recent summer folder, entitled "Where Are You Going for Your Holiday This Year?" saved the reader the trouble of selection by showing the six best routes for a trip. As in the case of the motor coach companies, this operator's livery or private party service is a regular factor in the business —whether it be the conducting of parties to a play or to a football match. Circular tours are very popular, since those who partake in them get a maximum of sightseeing for a minimum of expense.

As the Birmingham & Midland offers such a good example of long-haul motor-bus possibilities, it will be unnecessary to describe other installations of like character. The company is deservedly proud of its record of safety and reliability in service. In 1920 it rolled up the total of 4,500,000 bus-miles. In May, 1921, it operated more than 40,000 miles per breakdown despite the long runs and many hills in its territory. This is a satisfactory answer to the question: Can motor buses be relied upon to give steady service day in and day out?

While the territory served by this company is exceptionally fine for pleasure travel, the writer found the motor bus no less popular in districts where nature and the highway departments have been less generous. This was particularly so in mining and mill districts where interest in sports is so keen that people will travel long distances to see their favorites play in the inter-county cricket or football matches. The hiring of individual motor buses by groups of friends makes these trips more attractive than rides on British railway cars with their isolated eight or ten-passenger compartments and their absence from the open road. The great increases in railroad fares and the excessive overcrowding of the trains in recent years, for one cause or another, have also been potent factors in drawing the masses to the overland motor bus.

The Great Vogue of the Sightseeing Coach

Aside from the growing numbers and services of passenger motor buses, there has been an equally striking increase in the number of what we term sightseeing cars, and the British call motor coaches. The excellence of British roads, the Britisher's love of out-doors and the absence of American extremes in heat and cold all tend to the permanent popularity of this form of transport.

While our own sightseeing cars have been confined to turns about the large cities and nearby resorts, the British motor coach has reached out several hundred miles. The vehicles are of ever-improving comfort and luxury, with pneumatic tires to make the harder roads easy and suitable protection against changes in weather. The operators of these services are doing everything they can to promote the feeling that the ride on the coach to and from the vacation destination is a part of the vacation itself—not like a hot ride on a train. The fare is no greater than third-class railway. While the trip, naturally, takes longer than the train there is compensation in its agreeableness, and the sureness of a seat. These latter features are appreciated by many others than vacationists. It has been found that women, especially, will take all-day rides by motor coach in visiting distant friends—and this is true quite regardless of the season.

To stimulate traffic on off-days, the experienced operator also grants half rates on certain days or makes some other concession that will keep his investment busy. On some of the regular runs, there is a temptation for the passenger to return the same way by rail for the sake of saving time. This is offset by a liberal reduction in the round-trip rate. Thus where the one-way fare is 13 shillings, the round-trip fare will be 21 shillings instead of 26 shillings. Children in arms are usually carried free, and those under twelve years of age are carried at half rates except Saturdays, Sundays and other high-pressure times. The luggage of the patron is handled for him by the operator's own express vans under far more agreeable conditions than if he traveled by rail.

Motor Coaching as a Business

Characteristic of the great development of the motor coach services is the work of the Samuelson Transport Company, which has taken all England, Scotland and Wales as its province. Its slogan of "First class service at third class (railway) fares" has been liberally advertised in newspapers, on billboards and elsewhere, so that the traveler is not left in much doubt as to the cost of a journey.

The term "booking for a journey" has a very real meaning in Great Britain, the Britisher being far more used to making reservations than we are. This practice naturally is a great help in the economical scheduling

of traffic, and is best for the traveler himself since he is assured of getting just what he expects. Seats for longer tours by day or week can be reserved by mail on forms. Either 25 per cent or all of the fare is paid on making reservation. In the former case, the remainder of the fare must be paid three days before the tour starts. For shorter runs, booking can be made with a shorter period of grace, either at the offices in London or at those of any booking agent throughout the country. In any case, all seats are booked in advance.

An important feature of this motor coach service is that the passenger's luggage up to 56 lb. is carried free in advance from the passenger's domicile to his next stopping place by special motor trucks or vans which call a day in advance. Excess luggage is handled at less than railway rates. Therefore, the vehicle is not encumbered with unsightly trunks or other baggage. The service also includes the reservation of hotel accommodation where that is desired.

A splendidly printed guide book describes the six to ten-day circular tours of North Wales, the Lake District, Devon-Cornwall and other beautiful spots of Great Britain. These are now made truly accessible by rubber-tire transport, for no vehicle on rails can approach the sight-worthy places so well or give the passenger so free and smokeless a view.

At the present time, this company is running daily services between London and the principal seaside and country resorts for passengers booked on regularly scheduled vehicles. The flexibility of motor coach service, however, permits the throwing in of many extra vehicles on any desired route almost instantaneously—as in concentration on the Derby or other great races. The Derby of 1921, by the way, was called the "Petrol Derby" because the coal strike left the handling of the vast masses who go to this race so largely to the gasoline vehicle. In addition to the regular touring and coaching services named, this company like others does a large business in carrying private parties to any part of the country via any combination of routes desired.

Road Sleeping Coaches Next

The hold which the motor coach has taken on the imagination of the public may be gaged from the fact that England's most widely-circulated newspaper, the *Daily Mail*, devotes several columns every Wednesday to this subject. The startling announcement has recently been made by one operator that he is preparing a night motor coach service between Manchester and London. Two night coaches with sleeping berths and other luxuries, he said, are already under construction.

The Legal Status of the Motor Bus and Coach

Although both motor buses and motor coaches pay a definite license to the Government, not all the questions that have come up through their widespread use have yet been answered. Operators of local transport undertakings—whether street car or bus—are rather afraid that these outside vehicles may pick up en route people who would otherwise take short rides with them. In one case, where the local transportation company complained it was shown that the only people picked up were those who had already booked their seats in advance. Nevertheless, the complainant held that these passengers should have been picked up only at the regularly designated booking station in town. If the latter practice were followed, patrons would be deprived of the convenience of having the vehicle stop at or near their homes. Generally speaking, the fear of such competition is exaggerated, inasmuch as these vehicles are not run for the rapid interchange of short-haul passengers.

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SAMUELSON
MOTOR COACH
THE BEST IN THE LONG RUN
COMMENCING MAY 12
DAILY SERVICE
BETWEEN
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All Seats Booked in Advance.
RETURN TICKETS AVAILABLE FOR SIX MONTHS
1921
PASSENGERS' LUGGAGE CARRIED FREE
in advance from Door to Door by Special Vans up to 56lbs. per passenger.
SPECIAL QUOTATIONS FOR PRIVATE PARTIES TO ANY PART OF THE UNITED KINGDOM
DAILY SERVICE TO ALL RACE MEETINGS WITHIN 100 MILES OF LONDON
DAY EXCURSIONS WILL BE RUN AT REDUCED FARES TO BRIGHTON, EASTBOURNE and MARGATE ON WHIT SUNDAY
(Leaving London at 9 a.m.) and on WHIT MONDAY and REMAINDER of WHIT WEEK (leaving at 8.30 a.m.) RETURNING SAME EVENING
SEATS NOW BEING BOOKED FOR THE DERBY
Book Your Seats Early by Telephone, Post, or Calling Personally at the Offices of
SAMUELSON TRANSPORT COMPANY LTD.
28, DENMARK STREET, CHARING CROSS ROAD, W.C.2
Open 9 a.m. to 9 p.m., Sunday included.
Telephone: REGENT 925.

An example of one of the numerous posters used to advertise the extensive motor coach service operated by various concerns

The fewer stops they make, the better the service they can offer to the long-haul rider they are after.

The growth of overland or interurban motor coaching has also outstripped the facilities for loading and unloading these vehicles. In one large provincial city, the writer has seen forty to fifty coaches in the morning covering most of the chief public square and adjacent highways. Some towns allow the local bus and coach operators the use of their streets for parking while denying that privilege to the outsider, who is compelled to go to some garage or hotel. As the business grows, however, the cross-country operators are getting together to acquire definite parking spaces, the interests of these companies having been taken in hand especially by the Commercial Motor Users' Association and the Motor Trade Association. The first station opened in London this year is said to be that of the Brixton Motor Works, Ltd., which acquired a three-coach space that is available to anyone in the field.

Thus it will be seen that as in the case of the motor-bus, the Britisher has carried the sight-seeing car to a point far beyond our "Seeing Chinatown" and similar diffident, short-haul services. Indeed, he has made it an integral feature of the transportation facilities of the nation.

IT is stated on good authority that the present automobile production of Austria, which consists of Vienna and surrounding mountain districts, is greater than the entire German production. Naturally owing to the economic conditions in Austria, very few cars can be sold there, and practically the whole production has to be exported.

Purpose, Aims and Possibilities of the S. A. E. Research Department

Manager of new activity gives his views of the functions to be performed and results sought. Difference between development work and fundamental research made clear. Society primarily interested in the latter.

By H. C. Dickinson*

IN general the testing of any individual device or any particular material is not included in the definition of research. On the other hand, the study of methods of test as well as the deduction of general information from a systematic series of tests is properly so classed, although to be of value as research the results must be put in such form that they can be of general application.

Development research is recognized as clearly an exclusive function of the individual engineer and the industrial laboratory. By far the largest part of the work of all laboratories connected with the industry is of this nature and as such is recognized by the department as essentially confidential, whereas it is coming to be more and more generally recognized—although we regret, sometimes more as an abstraction than as a course of action—that there is much more to be gained than lost through a free interchange of all research information which is capable of general application.

The Research Department of the Society of Automotive Engineers will confine its efforts to explorational and intensive fundamental research. Much work of this nature, which is in progress in the industrial laboratories, will be of interest to the department and it is hoped that much more such work will be undertaken in the future. But with the major part of the work of these laboratories which is development work, we will not concern ourselves.

Time and Effort Saving

An unbelievable amount of time and effort is wasted in the trial of expedients which a more careful application of the fundamental laws of physics and chemistry would have shown at a glance were based on incorrect assumptions. This fact was startlingly illustrated during the war when thousands of inventions of every conceivable sort were presented for consideration of the Government. It is safe to say that at least 90 per cent of these proposals showed such obvious and fatal errors in fundamental physical and chemical principles that they could be absolutely condemned at a glance. Of course most of them could be condemned equally on practical grounds, but one's judgment as to practical possibilities is by no means so safe a guide. Many things which look impractical do actually work, but so far as we know nothing works which violates the law of conservation of energy, or the second law of thermodynamics, or Newton's laws of motion, barring Einstein, or any other of a few hundred such principles.

Successful engineering research, as well as economical development work, requires men with a peculiar combination of broad fundamental knowledge and sound common sense, with the enthusiasm of the typical inventor but without his typical shortcomings.

The most common incentive for the organization and continued support of research laboratories or of any systematic research program is necessarily the commercial one. In fact, this is almost the only one if we except some of the educational laboratories which have been endowed purely for the sake of the advancement of science. Thus almost every research laboratory and particularly the industrial ones present a constant conflict between these two points of view which are somewhat incompatible. The true research worker is interested in securing facts and will not be satisfied until his results are complete. Moreover, every problem he undertakes presents to him numerous side-lines which are of absorbing interest. If given his own way, unless he is endowed with unusual self-control, he will either carry through his problem to a final conclusion or switch to some side-line of greater interest, according to his temperament. On the other hand, the director of the laboratory or the "man who pays the bills," unless endowed with unusual patience and foresight, will, as soon as some fact of apparent commercial value is developed, recommend dropping the research and developing something useful. A happy compromise between the two points of view is difficult to attain. But a real compromise is necessary since both viewpoints are important and neither side may be neglected.

Up to within the past few years the United States, which has shown by far the greatest industrial development in our line, has contributed comparatively little to the sum of automotive research. The work of British and German experimenters had to serve the needs of our own engineers even though it was entirely inadequate for our needs. In the past few years, however, there has been a general awakening to the need of research among members of the Society. Its importance has been so ably presented in recent papers and discussions that it is hardly necessary to further emphasize this phase of the subject. We are now awake to the need, and once awakened the United States will not lag behind. In fact, perhaps a warning is needed that while the possibilities of research can hardly be overestimated, the realization of these possibilities in terms of industrial results, rests with the engineers in charge of design and development. No matter how many and able the research engineers, nor how important their conclusions, these conclusions will be of value only insofar as they are embodied in successful design.

In general, the object of the Research Department is to secure through concerted effort more, and more re-

*Abstracted from a paper by the author, recently appointed Director of the Research Department of the Society of Automotive Engineers, read at a recent meeting of the Detroit Section of the Society.

liable, fundamental technical information for the use of the members of the Society and to make this information more easily available. The distribution of information may be handled in several ways.

Fundamental research is in the last analysis almost entirely a question of men rather than of equipment. Many of the most important scientific results have been obtained without laboratory equipment worthy of the name. A study of the research situation in the various laboratories leads to the conclusion that these laboratories are even now sadly undermanned, particularly with men of real ability. To establish a new laboratory could not increase the supply of first-grade research men; hence it would have to be manned at the expense of existing institutions. Thus, whatever results the new laboratory might attain would be at the expense of other institutions and the net result would probably not be increased research. It appears therefore that the department can most profitably devote its efforts to assisting existing laboratories.

The three classes of laboratories—educational, industrial and independent—occupy altogether different positions in regard to research, and any general plan must take account of these differences. It is recognized that the prime object of the industrial laboratories, those directly connected with the various manufacturing companies, must always be development research. But in connection with this we hope there will be accomplished an ever-increasing amount of fundamental research work which can be made of general value—such work as deals with general principles rather than specific questions of design. It is a very common experience to find one laboratory undertaking a research intended to cover some problem which has been carefully covered elsewhere, but no record of which is available. It is one of the aims of the Research Department to secure, so far as possible, the publication, or at least a record of such non-confidential general results and to act as a clearing house of information on research problems of this character. For the most part, the various laboratories are rather well supplied with problems, but from some institutions where new facilities or new men have become available, there have come requests for suggestions as to problems or general lines of work which might be taken up to advantage. It would seem that here is a splendid opportunity for better use of the educational laboratories by the industry. The custom of farming out individual research problems has been followed to some extent, but there is room for much more of it. The Research Department stands ready to offer any possible assistance in securing more co-operation of this kind.

Duplication of Research

Recently very much caustic criticism has been heard regarding duplication in all sorts of connections, including research. One might make remarks about the duplication in criticism. Research is always a matter of duplication since no physical fact is ever established except through repeated observation. Much apparent duplication is not only desirable but necessary. Nevertheless, this applies to intelligent duplication only. Not much is to be gained by having several different laboratories working on the same problem unless each knows something about what the other is doing. This latter sort of duplication should be avoided particularly among the educational laboratories so far as possible. Since the results of most research are not to be had in print for months or perhaps years after the work is begun, the most promising means of preventing unnecessary repetition seems to be through some central clearing-house for work proposed and in progress. This function the Research Department will hope to fulfill.

One of the important objects of the Research Department is to assist toward the development of a more systematic program of research throughout the industry. The formulation of such a program is too much of a problem to be solved for some time to come. It must be built up little by little with the co-operation of the members of the Society.

General Research Program

There are, however, two broad general problems which are brought to our attention at once by their importance and the insistent demand for immediate information. These are the fuel problem and the highway problem.

A very important question is, What is the relation between endpoint or volatility of fuel and the average fuel consumption in actual service? To answer this we must know what constitutes upper limit of volatility—is it endpoint or something else? Mr. Wilson of Massachusetts Institute of Technology has brought out something of interest here, but the question is not yet answered.

The highway problem has received less attention by the automotive industry partly because its importance seems to have been less recently appreciated and partly because it does not appear at first sight so immediate a problem of the industry. It has been heretofore mainly a question of "good roads." So far as the passenger car alone is concerned, this may be largely true. Considering, however, the broad question of the economics of highway transportation, the problem is distinctly an automotive one. It is not possible to consider only the design of a truck, for instance, that will give maximum ton-miles per dollar if it has a road to travel on, without including also the cost of the highway. So long as registration fees for passenger cars paid for good roads, we were all reasonably content, but as soon as the highway is commercialized, so to speak, someone will be inquiring about the proper distribution of the highway bill among the different classes of traffic. Some answer to this question will have to be made. Perhaps it is a problem for the road engineer, but the automotive engineer will be very much interested in both the answer and the method of arriving at it. The nature of this answer or the relative license fees which may be based on it will be a large factor in deciding what sort of truck will be most economical for any given class of service.

THE quarterly progress report of the British Electrical and Allied Industries Research Association (E. R. A.), states that the council is carrying out a comprehensive program of research at the National Physical Laboratory. Tests are being made upon cotton fabrics dressed and undressed of various weights and treated with varying thicknesses of varnish. A collection is being made of samples of treated fibrous insulating materials with a view to classification before proceeding with tests. A complete series of purchasing tests is to be made on samples of untreated papers used for various electrical purposes, the investigation including the testing for impurities such as metallic inclusions and carbon obtained from soot in the atmosphere, as well as porosity conditions. A large number of samples of treated papers has been collected. The numerous other materials in use have been classified, with the exception of vulcanized fibers, and a preliminary schedule of acceptance tests for purchasing purposes has been prepared.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE
Reg. U. S. Pat. Off.

PUBLISHED WEEKLY
Copyright 1921 by The Class Journal Co.
Vol. XLV Thursday, October 27, 1921 No. 17

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Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C Pearson, Treasurer; Fritz J. Frank, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly) July, 1907.

Service—An Aid or Hindrance to Sales?

ANALYSIS of the market for future car sales indicates definitely that service will play an increasingly important part in selling. It will be a sales resistant or a sales help, depending largely upon the way in which service is handled during the next few years. The percentage of replacement sales is constantly mounting, and in every such sale previous service experiences will be a factor in buying. The man who has never owned a car may not consider service facilities and methods very seriously, but the man who is buying his second or third car will be influenced definitely by his past experiences as regards buying parts and having repairs made.

This fact should be fully recognized in discussing service policies. The manufacturer of cars and trucks is in business to make a profit from the vehicles which he sells. He will ultimately make the greatest profit if his product is serviced to the satisfaction of the user. The user will be best satisfied when he receives the best possible service at least possible cost.

A prominent student of this question recently defined service as "taking care of the owner; making the owner satisfied." Service of this kind will mean lessened sales resistance and consequently greater profits. From a purely business standpoint this should be the basis of service policy discussions. The question as to who should have the right to sell parts must ultimately be solved by allowing the person to sell the parts who can do it the most economically. Efforts along this line will be of more permanent value than any attempt temporarily to resist economic laws.

Improving the Fuel as Well as the Engine

THERE is a disposition among automotive engineers as a class to accept as inevitable the general tendency toward a decrease in the volatility of motor fuel without much thought being given to the benefits which would result if the fuel as well as the engine could be improved instead of being allowed to deteriorate in quality. There are, fortunately, some few engineers who insist that it is neither just nor expedient for the automotive industry to bear the burden of continually changing engines to meet, or attempt to meet, the conditions imposed by having to utilize poorer and poorer fuel, while the petroleum industry sits back and serenely assumes that it is impractical to improve the quality of fuel—that the only way to meet the demand for motor fuel is to continue to cut deeper and deeper into the crude with corresponding decrease in volatility.

It is at least conceivable that the entire petroleum motor fuel supply might in some way be so changed as to render it usable in much higher compression and consequently more efficient engines, and that by this means the tendency toward increasing total consumption might be checked and the available supply made to go much further, while at the same time engine performance is improved. This apparent possibility is the subject of intensive research on the part of one of the largest automotive manufacturers in the country, and there are indications that at least one of the large petroleum refiners is giving the matter serious attention.

This is said to have been brought about by the fact that one of the large oil companies retailing gasoline in and about Baltimore recently experienced a marked falling off in the sale of this fuel because of the competition resulting from the marketing of benzol-gasoline blends. The latter performed so much better than straight run gasoline that the public readily paid a slightly higher price for it and greatly decreased purchases of straight gasoline resulted. The oil company was thus forced to market a benzol-gasoline blend of its own.

The limited supply of benzol available makes it impossible to follow this practice generally over even a large proportion of the country, but it has at least shown the oil companies that there is a sufficient difference between certain fuels for the public to be

willing to pay more for the better grade, even though it cannot realize the full benefits which would result if the compression of the engines it is using could conveniently be raised.

It is to be hoped that the lesson taught by this situation will not be lost. There is good reason to believe that crude oil contains, in one form or another, hydrocarbons which, when blended with gasoline, give the fuel desirable characteristics similar to those which benzol-gasoline blends possess. In any case this and other possible means for improving fuel should be made the subject of intensive research and automotive manufacturers should allow no opportunity to pass to impress this fact upon the fuel industry as well as upon Government agencies in a position to co-operate to the same end.

Interchangeability in Toothed Gearing

PRACTICALLY all systems of cutting gear teeth developed in the past were conceived in the belief that a practical gearing system should be interchangeable so far as numbers of teeth are concerned. For instance, in the standard involute system the smallest number of teeth is twelve, and a pinion with this or any other number of teeth will run satisfactorily with a gear of any number of teeth, up to a rack. This interchangeability, of course, is a valuable feature from the standpoint of the gear jobber who carries gears in stock and receives calls for all possible combinations. But it is of absolutely no advantage from the manufacturing standpoint. For instance, in the case of a train of gears in a machine, if one of the gears breaks or wears out, it must be replaced by another with the same number of teeth, because the center distance is fixed. In rear axle bevel gear drives it is sometimes desirable to offer an option on different reduction ratios, but any bevel pinion will mesh properly only with a bevel gear of a certain number of teeth, and the above remarks apply to spur gears only. The great majority of gears that are cut to-day are intended for a definite purpose, and what kind of mating gear they have to run with is definitely known before they are made. The interchangeable feature is then no advantage at all, and the sacrifices made to attain interchangeability are futile.

That a sacrifice in efficiency is necessary to gain this interchangeability is well known. The case is similar to that of combination tools. You can make a tool that will serve as a hammer, screw driver, wrench and several other things, but if you are using a hammer continuously you do not want that kind of tool; a tool designed for one purpose only will do the work better. Similarly a gear specially designed to run with another gear of a definite number of teeth can be made more efficient than one which has to be given such a form that it will run properly with a gear with any number of teeth from twelve to infinity.

In spur gears the tooth action is partly sliding and partly rolling, and the frictional losses naturally depend very much upon the proportion of these two forms of motion. It is within the power of the gear designer to vary this proportion within certain limits. This ratio depends upon the pressure angle, the relative number of teeth in pinion and gear, and upon the addenda and dedenda. When interchangeability with respect to tooth number is not required, the designer is more at liberty to vary these factors so as to obtain a greater proportion of rolling motion, and hence a higher efficiency.

That manufacturers are paying too high for interchangeability, or, rather, are paying for something that is of no value to them, is gradually coming to be recognized, and a move seems to be shaping to break away from it. The system has been standard practice for so long that many have come to regard it as the last word in gear practice, but in this day of keen competition any standard that has outlived its usefulness is given short shrift, and it would not be surprising to see the interchangeable system of gear cutting discarded in manufacturing before very long.

Foreign Selling Practices

THE success of certain foreign countries in international trade has been largely the result of uniform practice among manufacturers in conducting their foreign business. The German *cartels* were largely instrumental in aiding that country to gain and hold so many foreign markets.

This lack of knowledge among American manufacturers of what other manufacturers are doing has operated also to the detriment of each individual. The individual automobile exporter has not had the advantage of knowing in any accurate manner how his practices correspond with those of other manufacturers. Each exporter has had to blaze his own way to a certain extent.

In an effort to render practical service to the automobile industry, the recently reorganized Bureau of Foreign and Domestic Commerce is about to send to the various manufacturers a questionnaire designed to find out facts concerning various practices in connection with our foreign selling. While this questionnaire will deal with rather intimate information, the results will be held entirely confidential, as are income tax reports. The data obtained will be compiled in percentage form and the results made available to all the manufacturers in the industry.

Manufacturers will be enabled to know what is common practice; the Bureau will be able to examine foreign selling conditions in the light of these results and to give the manufacturers accurate and practical information that will be of real value in future foreign selling efforts.

The new Automotive Section of the Bureau of Foreign and Domestic Commerce is making a sincere effort to find out what practical information the industry needs and to secure that information in the most rapid and efficient manner possible. The success of this effort will depend largely upon the degree of co-operation extended by manufacturers both in supplying information and in giving constructive suggestions.

Parts Makers Report Better Dealer Trade

Increased Commitments Made to Meet Needs Developing in Near Future

NEW YORK, Oct. 26—Parts and accessory manufacturers who deal with automobile distributors and dealers are virtually a unit in reporting increased sales to this branch of the trade. They say there has been a marked improvement in the tone of this market and that the men who deal in automobiles rapidly are regaining their confidence. They have ceased to buy entirely on a hand-to-mouth basis and to an increasing extent are making commitments to meet needs likely to develop in the near future.

Business of the parts makers with manufacturers for October will show a slight decline from the volume of September in a majority of cases, although there are many concerns which report that their production has not been decreased and some which have had better sales. Generally speaking, conditions in the parts field are somewhat better in the east than in the middle west, except in the Milwaukee territory.

Collections Satisfactory

Collections on current business are entirely satisfactory. In this respect there has been a steady improvement in conditions each month since the beginning of the year with one exception. The chief concern of the parts maker is over the old orders which have been on his books for many months and for which materials were purchased before his customers ordered him to hold up shipments.

Stronger efforts are being made to liquidate the cash tied up in materials of this character. Some progress has been made each month but it has been a dreary job. The parts men have been reluctant to take their troubles to the courts and seek to enforce legitimate contracts. As a consequence about the only way they have been able to move fabricated and partly fabricated stocks waiting for release has been to make price concessions. This usually brings results from customers who have ready cash.

Expect Tapering Off

Parts makers generally expect a gradual tapering off of business from now until the close of the New York and Chicago shows. Most of those in the middle west are basing calculations on a greater decline than are those in the east. They are a unit, however, in the belief that fundamental conditions are growing stronger day by day and that there will be a steady improvement in conditions after the first of the year. They do not expect a boom and want none. Their expectation is that each month will show a gradual improvement over the one preceding, although they look for greater seasonal declines than have been apparent this year.

While there is no concern in the parts field over the trend of business, there is apprehension lest some of the smaller automobile companies may fail to weather the storm. This relates to companies which have done little or no business for more than a year. There are more truck than passenger car concerns in this category.

There is a considerable number of companies, almost without exception comparatively small, which are virtually in the hands of their creditors. Every effort will be made to save them, but some have reached the limit of their resources.

The situation in regard to finances is exceedingly gratifying on the whole, however. There have been no really large failures and there is no fear that there will be. Few companies have all the cash they need, but this condition is occasioning no alarm, although the burden of carrying creditors is bearing down more and more heavily on the shoulders of parts makers.

Three More Distributors Are Taken Over by Willys

BOSTON, Oct. 24—At a dinner of the dealers comprising the Eastern New England territory numbering 160, President John N. Willys, of the Willys Overland Co., announced the taking over of the distributor organizations at Boston, Portland and New London. The largest of the three is the Connell & McKone Co., of Boston. Willys stated that the discount to the distributor had to be reduced in order to increase that to the dealer.

The Connell & McKone Co. will continue selling Overlands at retail at its Worcester, Quincy and Manchester, N. H., branches. The Wentworth-Smith Corp. of Maine, taken over, will sell the line at Portland and Augusta.

The personnel of the new factory branch at Boston will be W. G. Northrup, formerly manager at Springfield, Mass., New England branch manager; Weldon McKone, Metropolitan Boston manager; C. R. Arenschield, wholesale manager; C. F. Boles, service manager.

Jackson Is Taken Over by Associated Industries

JACKSON, MICH., Oct. 27—Announcement was made here to-day that the Jackson Motors Corp. will be taken over on Oct. 29 by the Associated Motors Industries which was incorporated recently in Delaware with a capital of $80,000,000. The real property of the Jackson corporation will be purchased for $1,105,000 in the preferred stock of the new company. Merchandise claims and bank indebtedness will be paid in bonds and stock following an appraisal.

The Associated Motors Industries proposes to take over at least a dozen other companies with physical assets valued at more than $50,000,000.

Supreme Court Ends Perlman Rim Action

Refuses to Review Decision of Lower Courts in Long Standing Litigation

WASHINGTON, Oct. 24—Refusal of the Supreme Court of the United States to review the decision of the lower courts brings to an end the litigation concerning the right to manufacture demountable automobile rims. The appeal of the Perlman Rim Corp. against the findings of the courts below in favor of Louis deF. Munger deals with the infringement of patent rights. The petitioner presented the question of validity and scope of the alleged invention of Munger. However, the action of the court allows the judgment of the lower tribunals to stand.

The Perlman corporation insisted that their appeal was in the public interest inasmuch as approximately one-half of the 9,000,000 of the automobiles in service are equipped with a set of five demountable rims and the decision of the courts below authorizes the collection of royalties by Munger amounting to $.1399 per rim. It was claimed that the effect of the decision below is to give Munger a monopoly in respect to wedging a tire to a rim.

The court was advised by the Perlman corporation that "Munger's principal invention was a non-collapsible tire and not a demountable rim." They furthermore claimed that the secret of the Perlman invention was the conical fit with the free space between the surfaces, except the narrow line of contact. This suit was instituted about five years ago.

M. A. M. A. Plans Mature for Export Department

NEW YORK, Oct 21—Plans for the promotion of an export department within the Motor and Accessory Manufacturers' Association are being matured. A strong committee will be appointed to initiate the work and carry it on. It is proposed to co-operate closely with the automotive division of the Bureau of Foreign Commerce. The M. A. M. A. headquarters in New York will be used as a clearing house for all export information in relation to possible markets for accessories and parts.

HUFFMAN ACTIONS DISMISSED

ELKHART, IND., Oct. 24—The Circuit Court of Elkhart County has dismissed actions filed against Huffman Brothers Motor Co. by creditors with claims aggregating $14,845. It is understood the claims have been paid. They were filed by the Goshen Buggy Top Co., the Ligonier Automobile Body Co., the Marion Malleable Iron Works and the Woonsocket Mfg. Co.

Goethals to Handle New York Operations

Plans Are Developed by Port Authority in Case Strike Develops

NEW YORK, Oct. 24—Governor Miller has vested in the Port of New York Authority, a board established by the states of New York and New Jersey, authority to handle all transportation facilities available in the event of a railroad strike. A plan of operation to meet an emergency already has been worked out by Elihu C. Church, consulting engineer to the Port Authority. General George W. Goethals has been selected commander-in-chief of the motor service.

The essentials with which the city must be supplied in the event of an emergency are food, including staples, milk and forage for horses; mail; gasoline and coal. There also will be some essential long distance passenger transportation and some essential commuter business.

The means of transportation in the event of a strike will include a few railroad trains, depending on the number of locomotive engineers available, trucks, barges and ships.

To Police Road Traffic

In the event of a strike one member of the Port of New York Authority will be in touch with the retailers to determine what supplies are needed and where they are most urgently required. Another will keep in touch with wholesalers in the Metropolitan area to determine where such supplies can be found.

Another member, working with the state highway commission, will have authority to declare certain roads trunk lines and to close them to other traffic for a certain period during which another member of the board will arrange to have freight collected at a central loading point and still another member will allocate transportation units to that particular haul. Trucks using the trunk lines will move in convoys both ways under direction of motorcycle patrolmen.

Other members of the board will see that the necessary number of vehicles are available, that trunk road traffic is policed and regulated, that trucks are dispatched on time, that there are facilities for repairs in case of breakdown, that proper loading and unloading facilities are available and that each unit of transportation hauls a full load.

The Port of New York Authority also has collected all the data available on the number of trucks available in the Metropolitan area.

Parts Makers Will Use Trucks

NEW YORK, Oct. 24—Information received at headquarters here of the Motor and Accessory Mfrs. Assn. indicates that a great majority of the members are determined to continue factory operations by the use of motor trucks if there is a railroad strike. A majority of them have well balanced inventories and would experience little difficulty in keeping production at present levels unless the railroad strike lasted several weeks, which is considered highly improbable.

Arrangements will be made by parts manufacturers to make deliveries regularly by motor truck. It is believed that if there is a general strike many shippers who will be forced to resort to the use of trucks never will go back to the railroads for short hauls because of the advantages which they will find in motor transport.

Club Offers Services

TRENTON, N. J., Oct. 21—The Motor Truck Club of New Jersey has offered its services to Governor Edwards in the event of a railroad strike. The trucks controlled by members of the organization would be used first for moving foodstuffs and fuel.

Measures Taken in Chicago

CHICAGO, Oct. 24—Defensive measures in case of a general railroad strike have been undertaken by Chicago. The Association of Commerce will look after the food supply, fuel, etc. The city has on hand food to last three months, and the coal in storage, excluding industries, would last for a year. The milk supply of the city is less than 100 miles and will be handled by trucks.

Kentucky Prepared

LOUISVILLE, Oct. 24—Should the railroad strike be called as threatened, Kentucky has 14,122 motor trucks to combat the cessation of train service, figures obtained from the State Department of Automobiles, show.

Ford Says Manipulators Are Behind Strike Move

NEW YORK, Oct. 25—The threatened railroad strike is only "an attempt on the part of the manipulators" to bring about deflation, is the opinion of Henry Ford, and no one but the manipulators could possibly gain anything.

"The workmen have nothing to gain," Ford said in an interview at his New York headquarters. "I have talked with many of them during the past week and none knew definitely what he proposed to strike for. The public likewise has nothing to gain and much to lose if the strike actually goes into effect. The gang wants to get prices down so they can get in on more of the profits.

"We have no labor problems on the Detroit, Toledo & Ironton Railroad. All the workmen are paid on the same basis as the men in the Detroit factory. This is a higher rate than that paid to labor on other railroads. The 450 miles of road is now being operated profitably in spite of the fact that the workers are better paid than previously and even so we have reduced freight rates in whatever instances the Interstate Commerce Commission permitted."

Reverting to the automotive industry, Ford declared with emphasis:

"The world is on wheels. I have no fear for the automobile business. Why should I? Our branch across the river in the meadows on ground that used to be a swamp, now does a business of $60,000,000 a year."

Indiana Industries Join to Meet Strike

Questionnaire Is Sent Out in Order to Obtain Truck Details

INDIANAPOLIS, Oct. 24—A definite detailed plan to meet the emergency of a railroad strike by means of highway transport has been presented to Governor McGray by Tom Snyder, secretary of the Indiana Highway Transport and Terminal Association, and Lynn M. Shaw, secretary of the Indiana Automotive Trade Assn. Under the plan 19 statewide industries in the transport, transfer, warehouse and automotive fields will co-operate. The plan provides for the appointment of a transport commissioner and a highway supervisor to direct traffic over the most suitable highways. The entire state would be zoned and the various units co-ordinated.

It is expected that approximately 50 per cent of the 40,000 trucks of the state will be available for use in the event of a strike. Every important center in the state has been reached by a questionnaire sent out several days ago and reports are being received by every mail giving the number of trucks each concern reached can devote to the emergency.

Fix Rates

Exact details of every truck pledged are being tabulated, giving the size, the kind of bodies used, the rates at which they will operate and the routes, warehouses and terminals to and from which these vehicles can operate most efficiently. In almost every case the rates to be charged for motor freight and express down to third class will be the common carrier rates, although some of the units will have to be assured of return loads to make this figure possible.

The Indiana Highway Transport and Terminal Association and the Indiana Transfer and Warehousemen's Association will form important units around which the emergency system will be built. There now are nine motor express lines radiating from Indianapolis with terminals in Crawfordsville, LaFayette, Marion, Kokomo, Muncie, Greeneburg, Columbus and Bloomington.

The Indiana Federation of Farmers and the Indiana Automotive Trade Association will co-operate.

In Indianapolis alone, there are 2338 trucks engaged in the distribution, transfer, cartage and transfer service.

DUESENBERG WANTS MEDAL

PARIS, Oct. 16—Through the representative of the American Automobile Association, the Duesenberg company has put in a claim for delivery of the gold medal which constitutes the "Grand Prix" of the Automobile Club of France. The medal was won by Murphy in the race at Le Mans last July, but was not ready for presentation when the team sailed for America.

Ford English Sales Reported Improved

Output of Foreign Plants for September Aggregates 4525 Cars and Trucks

DETROIT, Oct. 26—Total production in the Ford Motor Co. plants outside the United States and Canada was 4525 cars and trucks in September. These were built in Buenos Aires, Copenhagen, Bordeaux, Sao Paulo, Cadiz and Manchester. The Manchester plant output was 2631. Ford Motor Co. of Canada produced 2937.

Sales in England are reported better than they have been for some time with business conditions showing a much firmer tone. Post-war depression is reported giving way not only in England but in many parts of the Continent and much better foreign trade conditions are looked for.

All Ford branches throughout the United States continue operating on a large scale. Detroit led in September assembly with 7408. Kearny, N. J., was second with 7036, Chicago third with 6000 and St. Louis fourth with 5525.

Body production at the River Rouge plant, Detroit, is on the increase, particularly in touring car bodies. Fordson tractors to the number of 827 were built in September at the Rouge plant.

Reports that a large part of the River Rouge plant would be set aside for the manufacture of gasoline propelled railway equipment, from hand-cars to locomotives, are denied at the plant. Equipment of Ford's railroad is overhauled in a section of the Rouge, but manufacturing is not under consideration.

Portage Stockholders Make Counter Offer

CLEVELAND, Oct. 24—Stockholders of Portage Rubber Co., which F. A. Seiberling offered to buy for $750,000 have made a counter offer of $1,000,000 to the referee in bankruptcy. The referee recently ordered the Seiberling offer accepted by the trustees, unless stockholders demurred or offered a counter proposition before Oct. 21. Immediate hearing of the stockholders' proposal is expected, although final decision rests with Federal Judge Westenhaver.

New Maccar Truck Model, 2-Tons, Listed at $3,300

SCRANTON, PA., Oct. 25—An additional model, of 2-ton capacity, and known as Model H-A, has been developed by the Maccar Truck Co.

It is fitted with a Continental four-cylinder 4⅛ x 5¼-in. engine, Maccar fin and tube radiator, Zenith carbureter, Eisemann high-tension magneto, Mueller governor, Brown-Lipe gearset and clutch, Spicer universals, Merrill springs, Ross steering gear and Timken worm-drive rear axle. The truck has a wheelbase of 150 in. and is also made in a long model with 162 in. wheelbase. The rear axle is of the full floating type and gives a reduction of 8.5:1 on high and 45.47 on low gear. The frame is made of alloy steel ¼-in. stock, the channels having a height of 6 3/16 in. and a width of 2½ in.

Of the total weight of the loaded truck 70 per cent rests on the rear axle and 30 per cent on the front axle. The weight of the complete chassis is 5200 lbs. Steel wheels are fitted, with solid tires 36 x 4 in., single in front and the same size dual in the rear.

The chassis price is $3300.

G. M. C. Stockholders Show 1513 Increase

NEW YORK, Oct. 24—The number of shareholders upon the books of the General Motors Corp. Oct. 3 was the largest in its history. The record taken in connection with the quarterly dividends which will be paid upon Nov. 1, showed 66,837 names, an increase of 1513 over the preceding quarter, and an increase of 29,943 over a year ago. The detail of the number of stockholders receiving dividend checks upon Nov. 1, compared with the preceding quarter follows:

Classes of Stock	Nov., 1921	Aug., 1921
6% Preferred	$3,208	$3,170
6% Debenture	10,083	10,107
7% Debenture	8,906	9,046
Common	44,640	43,001
Total	$66,837	$65,324

Industry Contemplates Safety First Campaign

NEW YORK, Oct. 24—A movement is under way for the organizations within the automotive field to co-operate in the promotion of a vigorous safety first campaign to cut down highway accidents. It is realized that the large number of fatalities and injuries caused by motor vehicles has become a sales deterrent, and it is believed the industry should play a larger part than heretofore in combating carelessness not only of pedestrians but of drivers.

If such a campaign is undertaken all manufacturers and dealers will be asked to co-operate not only in their own communities, but in a nationwide educational effort to promote the use of safety appliances. Many accidents are due to faulty brakes, for example, and it is believed a campaign to bring about more careful and frequent inspections of brakes would do much to prevent accidents.

HINKLEY TRUSTEE APPOINTED

DETROIT, Oct. 24—The Security Trust Co. was named as trustee for the Hinkley Motors Corp. at a meeting of creditors before a referee in bankruptcy. An involuntary petition against the company was filed recently by three minor creditors.

Makers and Dealers Arrive at Agreement

N. A. C. C. Committee Will Submit Conference Proposals to Members for Final Action

DETROIT, Oct. 24—Committees of the N. A. C. C. and the N. A. D. A. have closed the series of conferences which have been held on contractural relations by arriving at tentative agreements on the points outlined. These will now be submitted to the membership of the N. A. C. C. for consideration and final action.

In a statement following the meeting, Alfred Reeves, general manager of the N. A. C. C., said his organization was in complete harmony with the dealer group and was deeply interested in helping overcome the obstacles now interfering with the safe progress of the industry. Every effort will be made, he said, to clear away the difficulties with which the trade is now faced so that there will be no unnatural barriers to sales in 1922.

To Stimulate Sales

One of the important actions taken at the conference in a sales stimulating sense was the decision to make the New York and Chicago national shows more merchandising events than they have been in the past. Recommendations will be made to the show committee of the N. A. C. C. which are designed to give dealers greater opportunity to develop sales on the show floor than at former shows.

A decision to go to the mat with the used car situation immediately was another matter upon which an agreement was reached and recommendations will be made to manufacturers at once so that dealers may have united backing in the movement. It was agreed that trade-ins are a necessary factor in doing business but that they can be handled in such a way that present abuses may be avoided. Reeves said a survey of the used car situation is now being made which upon completion will permit the manufacturers to approach the subject with a more complete knowledge of its ramifications.

Discountenance Truck Trades

The process of cure will be slow, he said, in view of the extensiveness of the evil, but it will be brought under control. The committees were agreed that trade-ins in trucks should be discountenanced. N. A. C. C. representatives attending the conference were: W. E. Metzger, chairman; Colin Campbell, Hal B. Boulden, F. E. Conner, W. E. Voorhis, Percy Owen and Alfred Reeves. For the N. A. D. A. they were: Jesse E. Smith, Harry Harper, N. H. Cartinhour, Fred W. Vesper, J. E. Eldridge, Harry G. Moock.

Directors of the N. A. D. A. who had attended a meeting preceding the joint conference were invited to sit in at the session.

Little Change Seen in Retail Car Trade

Outlook for Enclosed Models Especially Bright—Truck Sales Increase Steadily

NEW YORK, Oct. 25—The trend of retail trade in passenger cars has shown little deviation in the past week from the level of the last six months. The first half of October was surprisingly good, but a gradual slowing up of sales is to be expected in most sections of the country as the touring season closes. The outlook for enclosed car business is uncommonly good, however, and nothing has arisen to change the belief that the aggregate of sales in dollars for October will equal September.

There is evidence of a growing opinion among body makers that there is too great a difference between the prices charged by car manufacturers for open and enclosed models. It is held in some quarters that not all this margin is justified, and some body builders are inclined to stand pat on their prices for enclosed jobs until the cost to the ultimate consumer is reduced.

Strike Will Help Trucks

Truck sales are increasing slowly but steadily as general business conditions improve. A fillip has been given them by the threat of a general railroad strike. The strike menace has given tremendous emphasis to the essentiality of motor vehicles as transportation units. Their reliability is proven by the fact that the nation has turned instinctively to them in the face of an emergency, in the realization that their mobilization will prevent industrial paralysis if the carriers cease to function. Manufacturers and dealers are taking advantage of the opportunity to convert bankers who have been skeptical about handling truck paper.

If there is a railroad strike it will not have a demoralizing effect on automobile production unless it is longer lived than is probable. Most passenger car makers have inventories sufficiently large to permit production for some time without bringing in large quantities of supplies. Such materials as may be needed can be transported to the factories by truck. It will be possible to deliver cars by means of "driveaways" except to points far distant from factories.

Tractor Prospects Improve

Reports are filtering in from tractor and farm machinery manufacturers that the winter months promise to bring an unexpectedly large volume of business from the rural districts. This is evidence of generally improved conditions in the agricultural sections.

The crop of rumors about impending mergers, combinations and consolidations is growing larger rapidly. A few of them are plausible but most of them are somewhat ridiculous. Reports of prospective combines of truck concerns are most common and a majority of the companies in the business are mentioned.

While it will be found that few of the reports are founded on fact, it undoubtedly is true that consolidations are in the air and the next few months probably will witness several of them. One which promises success would bring together fourteen automotive concerns with physical assets valued at some $50,000,000. Another even larger combine is contemplated.

Stockholders Will Ask Bankruptcy for Revere

INDIANAPOLIS, Oct. 24.—Stockholders of the Revere Motor Car Corp. of Logansport have perfected an organization known as the Revere Stockholders' Protective Association. Officers of the organization are J. H. Reitemeier, president; Carl Rehm, vice-president; Dr. R. L. Swindler, secretary; David Middleton, treasurer.

Perfecting of the organization is the first step in the plans of local Revere stockholders to have the concern declared bankrupt, it is said. Officers of the stockholders' organization plan to file a petition in bankruptcy in the Federal court at Indianapolis, it was announced by officers.

The concern at the present time is in the hands of a receiver, and stockholders hope, by having the company declared bankrupt, to reorganize and put the plant on a paying basis and retain the industry in Logansport.

Underwriters Suggest Fixed Depreciation Plan

NEW YORK, Oct. 24—The policy under which the amount of insurance is automatically diminished monthly has not met with favor by the committee on forms of the National Automobile Underwriters Conference which is holding meetings in this city and which is now taking up the question of a policy which provides that the assured shall bear a portion of each loss.

A suggestion has been made that the conference adopt a plan of fixed depreciation and make its use mandatory for insurance purposes under a form of policy which could not be construed as "valued." If a monthly decrease in insurable value greater than the mandatory decrease were accepted by the assured, it is suggested that a reduction in rate might be allowed. This it is felt would win the moral support of automobile manufacturers and take a long step toward putting the business on a proper basis.

U. S. TIRE ADDS NEW SIZE

NEW YORK, Oct. 24—The United States Tire Co. has added one more size to the Royal Cord tires, this being 30 x 3½ in., the retail price of which is $24.75. The new size is made of the same material and compound as is used in the larger sizes. Experiments have been going on for quite a long time.

War Supply Transfer Totals $118,264,808

Majority of Motor Vehicle Surplus Goes to Other Government Agencies

WASHINGTON, Oct. 25—Figures prepared by the Director of Sales to-day show that vehicles valued at $118,264,808 have been transferred from the War Department's surplus material to other Federal departments. The classification of vehicles includes motorized equipment which represented the largest percentage of vehicular equipment transferred. Transfers were made through the Transfer and Inventory Section office of the Director of Sales.

Vehicles turned over to other governmental agencies represented more than half the total value of army surplus material which was transferred. Sixty-six per cent of the surplus material which was transferred to the Department of Agriculture, cost the Government originally $138,290,529.

The vehicles transferred to the Agriculture Department were for the use of the Bureau of Public Roads which in turn transferred them to State highway departments. The total value of vehicles given to the Agriculture Department by the War Department amounted to $98,876,028.

The Treasury Department took vehicles valued at $2,766,712. The Department of Commerce received vehicles valued at $4,362,475; Navy, $2,014,732, and the Post Office Department $11,013,401. Aircraft material valued at $9,548,853 was also transferred. The air mail service of the Post Office Department took $2,919,547 worth of this equipment; Navy Department $5,088,456 and the Department of Agriculture $1,565,009.

Shuler Axle Creditors May Reach Settlement

LOUISVILLE, KY., Oct. 24—Assets of the Shuler Axle Mfg. Co., recently adjudged bankrupt in the Federal court, exceeded the liabilities by $274,495.86, according to schedules filed with Judge George A. Brent, referee in bankruptcy. The total assets are listed at $651,473.83 and liabilities at $376,977.97.

Several days ago permission was granted to the receiver to operate the plant. Orders on hand, it was said, amount to $3,000. The first meeting of creditors will be called for Nov. 2. It is believed a settlement will be effected and the operation of the plant continued.

BARLEY HAS NEW TOP

DETROIT, Oct. 24—Barley Motor Car Co. of Kalamazoo, manufacturer of the Roamer line, has added a new California top to its models which will sell for $2,950 f.o.b. Kalamazoo. Shipments of the new model are being made now.

Mileage Guarantee Opposed by Dealers

Tire Association Calls Present Policy of Adjustments Wrong and Unfair

CLEVELAND, Oct. 24—Delegates from all parts of the country to the National Tire Dealers Association, in session here, brought the word that the retail tire business is on the upgrade and that in their judgment there is to be a gradual improvement for some months. Dealer after dealer reiterated the assertion that October has produced better sales than September and that September business was in excess of August.

The delegates adopted a series of resolutions, militant in tone, for the betterment of the dealer. They went on record in favor of a policy to put an end to deceptive advertising with respect to tires. They recommended the abolition of the mileage guarantee, the discarding of adjustments, the adoption of a distribution policy that will prevent manufacturers of cars dumping unused tires on the market at unfair prices, and important exchange privileges. Copies of the resolutions adopted are to go to every tire manufacturer.

Association Expands

In his annual report, Secretary Philip O. Deitsch pointed out that the association had but 10 cities represented less than a year ago when the body was formed, and that to-day 24 cities are affiliated and 53 are in process of being organized for representation.

One of the features of the meeting was the accessories exhibition. Trips to Akron and Kent were a part of the convention program.

William O'Neil, general manager of the General Tire & Rubber Co., Akron; C. S. Harris, vice-president of the Union National Bank, and C. C. Waddell of the Goodyear Tire & Rubber Co., were among the speakers during the sessions.

R. F. Valentine of this city was elected president, to succeed Thomas F. Whitehead of Chicago, who became a member of the board of directors. Frank Zeman of Chicago, was chosen vice-president and Deitsch was elected secretary-treasurer. These officers and the following, in addition to Whitehead, constitute the board of directors: R. J. Walters, Baltimore; E. P. Farley, Minneapolis; R. R. Dooley, Cincinnati, and A. B. Clark, Kansas City.

Resolution Adopted

The resolution in relation to mileage guarantees follows:

"*Whereas*, We are all agreed that the present policy of adjustments by tire manufacturers is erroneous, misleading and unfair to the legitimate tire dealer and ultimate consumer, and often used to the disadvantage of the tire manufacturer, therefore be it

"*Resolved*, That the manufacturers of quality tires should take prompt action to correct this evil by eliminating the mileage guarantee as it permits the 'snowbird' or 'gyp dealer' or 'broker' to prosper unfairly by selling an inferior quality tire with an inflated list price and a long mileage guarantee to the trade at a big reduction from the inflated list price as an inducement to the trade, so when a tire proves defective and a customer returns with it, said dealer informs him that he will make an adjustment, but of course that said adjustment will be based on the list price. Therefore, the customer is compelled to accept said adjustment on that basis if he accepts it at all. This enables said dealer to make a profit on the adjustment at the expense of the user, therefore, be it further

"*Resolved*, That we believe a quality tire manufactured by a reputable manufacturer and sold by a reputable dealer needs no mileage guarantee. If the manufacturers do not deem it advisable to remove the mileage guarantee at this time, then we request that all adjustments be made through their authorized dealers who qualify as to their capability, and further be it

"*Resolved*, That said adjustments be based on the dealer's cost price of the tire, and why should not an authorized dealer make his prorated profit on what he purchased as a quality tire but which proved to be otherwise, the same as though he sold a new tire?"

Rubber Association to Act

NEW YORK, Oct. 27—The tire manufacturers' division of the Rubber Association of America will hold a special meeting at the Yale Club in this city to-day to consider a report made by a special committee which has been considering the subject of mileage guarantees on tires. The committee will make certain recommendations which the manufacturers will be asked to discuss.

A similar report was made some time ago but it was not entirely satisfactory to the majority of the manufacturers and the committee was asked to continue its investigation. While nothing can be learned in advance of the purport of the report there is a strong sentiment within the industry for the abolition of mileage guarantees.

Another subject which will be taken up at the meeting will be protection against price declines. This was first considered in September and since that time definite action has been determined upon.

Dunlop and Michelin Fusion Conjectured

LONDON, Oct. 7—(*By Mail*)—The Dunlop Rubber Co., Ltd., announces that dividends on the 5 per cent cumulative preference stock and 8 per cent cumulative ordinary stock up to Aug. 31 will be paid after the annual meeting which has been postponed to the end of this month. The reason given is that "important negotiations of a nature advantageous to the company" are in progress but will not be completed before that time.

There is much conjecture as to the nature of the "important negotiations." The belief is expressed in some quarters that there is likely to be a fusion of Dunlop and Michelin interests. It is pointed out that the revised price lists of the two companies which have just been issued coincide in all respects as to prices.

Durant Shipping Cars from Eastern Factory

Deliveries to Purchasers Will Probably Begin on Large Scale Nov. 1

NEW YORK, Oct. 21—Production of the Durant Four now is well under way in the Long Island City plant of Durant Motors of New York. While this factory will supply only the eastern territory after the Lansing plant gets under way, cars now are being shipped to dealers in all parts of the country. They went to California by express and are said to have met with a flattering reception there. It is expected that deliveries to purchasers will begin on a large scale about Nov. 1.

Rapid progress is being made in building up a dealer organization. The main centers of population in the eastern territory now have been covered and many distributors and dealers have been appointed in other sections of the country. The Michigan dealer organization has been practically completed and orders have been placed for the delivery of 10,000 cars in that State in 1922.

The Collins Motor Car Co. has been organized in Boston to distribute the Durant and A. A. Leidermann, who has been Pierce-Arrow dealer in Utica, will handle the Durant in that city. The Boston company is capitalized at $100,000 and is headed by Jerome T. Collins.

Name Markin to Head Commonwealth Motors

CHICAGO, Oct. 24—Under a reorganization of the Commonwealth Motors Co., a new staff of officers has been elected headed by Morris M. Markin who entered the automotive field in Chicago several years ago with the Markin Auto Body Corp. It is understood these two companies will be combined under one roof at the Commonwealth plant in Joliet.

Other officers of the company are three of the older members of the Commonwealth organization. Amel Carlson has been made vice president and general manager, Edward J. Bouchard, treasurer and Walter L. Kroneberger, secretary and sales manager. The plant at Joliet is now running six days a week. The general offices have been removed to 1509 South Michigan avenue, Chicago.

SETS BOND IN PATENT APPEAL

CHICAGO, Oct. 24—The Stewart-Warner Speedometer Corp. will be required to file bond of $150,000 pending action on the appeal of the company from the decision of Judge Carpenter in the United States District Court, of northern Illinois in the suit brought by Seager & Harrington, charging infringement of patent on the vacuum tank being manufactured and sold by Stewart-Warner.

Requires Financial Aid of Bus Patrons

Tidewater Lines, Inc., Makes Every Farmer Along Routes a Stockholder

WASHINGTON, Oct. 24—The Tidewater Lines, Inc., which operates fifteen passenger lines and ten freight trucks out of Washington over six routes reaching all points of Southern Maryland and down to Colonial Beach, Va. has inaugurated a plan for financing of passenger and cargo transportation lines which virtually makes every farmer making use of the service a stockholder.

In addition the company is given the hearty support of all of the town banks along the routes. These banks, realizing the need of this means of transportation, are often instrumental in getting the farmers to invest in stock through showing them that by aiding the company they are in turn also benefitting themselves through better service.

First Sell Banks

To date, there are 500 stockholders in the company, most of whom are farmers from Southern Maryland. The company realizes the importance of this financial support as a factor in determining the confidence of its patrons. Before opening a new route, it requires the entire support financially of all the farmers along that specific route. In a majority of cases, the local banks are first sold on the proposition. Sale of the stock is then carried on by the banks.

The governor of Maryland recently gave the company a franchise to operate its vehicles over the state roads. As a result of this permit, the company has effected a number of consolidations of competing truck and bus lines in Maryland, the most recent being that of the Arndt Transfer & Express Co., operating out of Baltimore. It has therefore been necessary for the Tidewater Lines to increase its capital to $250,000 7 per cent. preferred with a $100 par value and 12,500 shares of common, no par value.

Stock Dividend Ruling Is Amended by Treasury

WASHINGTON, Oct. 24—Considerable progress has been made on the tax bill now before the Senate. The Senate has increased the income surtax rates from 32 per cent, as provided in the House bill, to 50 per cent, to meet the demands of the so-called agricultural bloc. It is expected, however, that this rate will be reduced to about 40 or 42 per cent in conference.

The Commission of Internal Revenue to-day issued a new paragraph to be added at the end of Article 1547 or Regulation 45, as amended by Treasury Decision 3206, which relates to stock dividends. It reads as follows:

"Where the stock with respect to which a stock dividend is declared was purchased at different times and at different prices, and the identity of the lots can or cannot be determined, but the dividend stock issued with respect to such stock cannot be identified as having been issued with respect to any particular lot of such stock, then any sale of such dividend stock will be presumed to have been made from the stock issued with respect to the earliest purchased stock, to the amount of the stock dividend chargeable to such stock."

Tractor Sales Increase in Southeast Territory

ATLANTA, Oct. 24—Tractor sales in the Atlanta territory the first two weeks of October were better than they have been at any time within the past year, due to the recent increases in the prices of farm products, principally cotton. Few large tractors are selling in the Southeast, but the demand for the smaller machines has been so great the past three or four weeks that some dealers are unable to secure all of the tractors of this kind they can sell.

Virtually all of the dealers throughout Georgia are reporting good business. Business in middle and eastern Tennessee has been good all summer and is unusually good at this time. In North Carolina and Alabama conditions have picked up materially the past three weeks and are getting better daily.

Sales in South Carolina, however, are still rather poor and have been all year. In Florida, and especially the southern part of the state, sales are at normal for the first time almost in two years.

Mutual Truck Insolvent; Bank Appointed Receiver

SULLIVAN, IND., Oct. 24—At a hearing before Walter F. Wood, as special judge, the Mutual Truck Co. of this city was declared insolvent and on the petition of the Shuman-Pomeroy Co. of Chicago, with the Electric Steel Co. of Indiana, as the intervenor, the National Bank of Sullivan was appointed receiver.

Judge W. H. Bridwell, judge of the Sullivan circuit court, did not act, feeling that his interest in the Citizens' Trust Co., a creditor, disqualified him. In the presentation of the evidence, Luther Steele, vice-president of the concern, testified that the liabilities of the company amounted approximately to $85,000. He was unable to state definitely the assets of the firm, but said the personal property alone would total near $45,000.

NAME HOLMES RECEIVER

NEW YORK, Oct. 24—A petition in bankruptcy has been filed against the Holmes Motor Car Corp., of New York by three creditors who hold claims for about $2,600. Judge Hahn appointed Z. W. Butler as receiver under a $3,000 bond. The liabilities are estimated at approximately $40,000 and the assets about $6,000.

Small Car Favored by Japanese Buyers

Trend Is Also Shifting Noticeably From Enclosed to Open Models

LOS ANGELES, Oct. 24—Light, small cars continue to hold the Japanese automobile market, according to the latest advices received here. The trend from the large six-cylinder automobiles to the lighter types, which started following the imposition of the severe Japanese tax on automobiles, has become more and more marked in recent weeks.

The smaller cars, particularly those calling for the minimum tax, are moving fairly well, but the larger fours and sixes are finding few buyers. As a matter of fact, virtually the only sales being recorded in the larger cars are those being disposed of to government departments that do not have to pay the automobile tax.

There has been a very noticeable change in the demand for various body types in Japan in recent months. During the last six months open cars have become very popular in Japan, while formerly enclosed cars were all the vogue. Perhaps the change is due to the increasing number of owners who are driving their own cars and also because more motorists are taking trips into the country rather than confining their motoring to city streets. There are a number of instances reported from Japan where owners are selling their limousines and buying smaller cars with open bodies.

The Japanese body building trades are not enjoying a very healthy demand for their product, as the demand for the body of foreign manufacture is as insistent as ever. The Japanese body is declared to be usually equal, and often superior, in appearance to most foreign bodies, but the Japanese body builders seem unable to construct a body which will stand up for any appreciable length of time.

Africa Sends Wichita Order for Ten Trucks

WICHITA FALLS, TEX., Oct. 24—Decided improvement in its export trade has been noted by the Wichita Motors Co., which has received an order for ten 1½-ton trucks, pneumatic tired, to be shipped to the Gold Coast of Africa. Inquiries from many foreign countries are now being received and J. G. Culbertson, the company president, declares that export sales will continue to attain a better volume.

Nearly all motor transportation facilities in foreign countries depreciated during the war and owners now are discarding them for those of modern design. Culbertson added that the countries of South America, Africa and the Far East are purchasing practically all of the trucks from United States firms.

Paris Show Promises Good Business Year

Public Responds to Lower Prices —Repeal of Gasoline Tax Boosts Sales

PARIS, Oct. 16 (*By Mail*)—Manufacturers generally are satisfied with the results obtained at the Paris automobile show. Sales have been good in the lower and medium price class cars and moderate in the high class cars. When the show opened makers were nervous regarding results, for they had made a considerable effort to attract customers by better value and lower selling price, but they had no assurance that the public would respond.

It seems to have been realized that no further price reductions are possible, and as a consequence buyers' resistance has broken down and sales have taken place. This movement was accelerated toward the end of the show by a Government announcement of the repeal of two cents per litre on the state gasoline tax, to go into effect immediately, followed by another reduction of one cent on Jan. 1.

Owen Clegg of the Talbot-Darracq Co. stated that business had been so good they would have to start a double shift in the machine shops in order to keep pace with deliveries. Isaac Koecklin of the Peugeot Co. declared that the results had been surprisingly good, sales having been brisk on the whole series of models. In his opinion the show had surpassed expectations.

The Fiat Co. reported good business on the 10 hp. model. Louis Delage indicated that his small 11 hp. four-cylinder had sold well and there was a healthy outlook for the other types. Lancia reported good sales. Citroen is said to be fully booked up on his two lower price models.

It is believed generally that if the political situation remains clear the coming year will be a very successful one for French manufacturers. Gasoline prices are going down, tires are dropping, there will be no increased taxation on automobiles, and selling prices have stabilized.

S. F. Bowser Absorbs Richardson-Phoenix

MILWAUKEE, Oct. 25—The Richardson-Phoenix Co., which manufactures automatic lubricating devices and appliances for filtration and reclamation of lubricants at a large plant in this city, has been consolidated with the S. F. Bowser Co. of Fort Wayne, Ind. The deal involves more than $1,000,000. The combined companies have assets exceeding $10,000,000.

J. William Peterson, president of the Milwaukee company, becomes vice-president of the Bowser company. S. B. Bechtal, vice-president and general manager of Bowser, will assume the same duties at the Richardson plant, succeeding Louis E. Strothman, who is seriously ill and will retire to take a long rest. The officers of the Milwaukee plant will be retained. It is understood that the Richardson-Phoenix Co. will retain its identity with Peterson continuing as president.

EPIGRAMS THAT RIDE WITH JOHN N. WILLYS

NEW YORK, Oct. 24—John N. Willys, who has devoted much of his time for months to addressing Willys-Overland dealers in all parts of the country, has developed a reputation as a maker of epigrams. Here are a few of those he used in one of his recent dealer addresses:

"I take a train from New York for Toledo that gets in at 4:40 a. m. so I can get an early start instead of the train that gets there at bankers' hours."

"I'm never going to quit when business is bad."

"I'd rather work out than rust out."

"The public had me broke a year ago, and it saved me from a lot of 'touches' and explaining."

"Three weeks out of every four I am at the factory, and the other week I'm out on the road helping the dealers."

"My dealers have always been pals, not forced to walk on the bridge of formality to reach me."

"It takes a strong man to throw a bull, but we've had too many conversational bull throwers in the motor industry."

Wins $417,477 Verdict in Columbiana Suit

EAST PALESTINE, OHIO, Oct. 25—George W. Stevens has been given a verdict for $417,477 in a suit against the Columbiana Tire & Rubber Co. for breach of contract. The jury found that Stevens made a contract with the company to act as general sales manager for which he was to receive 5 per cent commission on the net sales of tires and tubes. The contract was signed May 1, 1918 and was broken, according to the plaintiff, on Nov. 13, 1919. It was the decision of the jury that Stevens was entitled to his commission on sales amounting to $7,768,550 from Nov. 13, 1919 to May 1, 1923 plus an increased salary and a bonus.

STUDEBAKER CUTS OUTPUT

SOUTH BEND, IND., Oct. 25—The Studebaker Corp. has temporarily curtailed its output in connection with the adjustment of winter schedules. President Erskine states that production in all plants during the fourth quarter is expected to exceed 60 per cent of the third quarter.

New British Sunbeams Have Overhead Valves

Changes Perfected in Engine—Vauxhall Introducing Model for Small Bodies

LONDON, Oct. 14 (*By Mail*)—The British Sunbeam cars of all sizes for 1922 will have push-rod operated valves in the head. The range will consist of the existing 16 hp. four and 24 hp. six-cylinder models (3⅛ x 5⅞ in.) with new engines and an entirely now model of 14 hp. with four cylinders 2 13/16 x 4¾ in., the engine being a unit construction with the three-speed gearset, which is an innovation for Sunbeam.

Vauxhall is also introducing a 12 hp. model for small two and four-passenger bodies, the engine having a bore and stroke of 2 15/16 x 5⅛ in. But neither this nor the new small Sunbeam will be of a popular price, for they are both to sell with a four-passenger body at $3,700 to $4,000.

Standard will also supplement the successful 12 hp. overhead valve chassis by one of 8-10 hp. with a four-cylinder, 2 7/16 x 3½ in. L head engine. The new air-cooled Armstrong-Siddeley will not be at Olympia, but an example will be in London during the show; this model, by the way, will not be sold as an "Armstrong-Siddeley," but will be given another name to distinguish it from the six-cylinder cars.

Nor is the 20 hp., four-cylinder Rolls Royce to be expected at the show; in fact, it is questionable whether a new type will supplement the 40-50 hp. six for some time to come. Present indications, nevertheless, point to there being at Olympia a record number of new models by well-known makers and, without doubt, the general trend is all toward smaller and lighter cars, more economical to run, if not of low first cost.

Firestone Loses Action Brought by Cotton Mill

CHESTER, S. C., Oct. 24—The Marlboro County Court has given the Marlboro Cotton Mills a verdict for $121,392 in its suit against the Firestone Tire & Rubber Co. to enforce compliance with a contract for the purchase of tire fabric. The contract was made in 1919 and under it the tire company was to pay $1.55 a pound for the fabric. When the decline in prices came, it was alleged, the Firestone company refused to accept the larger part of the fabric. This refusal resulted, the cotton mills contended, in the loss of the amount of the verdict.

The Firestone company was not represented in court and ignored the trial, claiming that the South Carolina courts had no jurisdiction in the case. It was shown at the trial, however, that the tire company has a distributing base at Columbia and a traveling representative in the State.

Price Uncertainty Felt in California

Prospects Fail to See Rock Bottom Reached and Adopt Waiting Attitude

SAN FRANCISCO, Oct. 24—Is the promise, freely made by some dealers to purchasers of cars, that there would be no more price cuts and that the price paid at that moment by the buyer was the ultimate, rock-bottom, absolutely final figure, acting as a boomerang and coming back to knock the business of these dealers in the head?

Many of the dealers and distributers on the Pacific Coast are beginning to think so, and many of them are referring with regret to the congratulatory words they said to buyers a few months ago, relative to the buyers having been fortunate in waiting until the "last price cut."

Public Always Dubious

To tell the plain truth, a good many of the "wiser" dealers are of the opinion that the public has reached the point where it never will cease expecting further price cuts, and that this is one of the strongest, if not the very strongest, reasons that the prospects are not coming forward to buy new cars. It is certain that the majority of men who now own automobiles in northern California—and, probably, in southern California as well—are spending real money in repair shops to have their cars rehabilitated and kept in the best possible condition, so as to get every remaining mile out of them without buying new cars.

One man closely connected with the automotive industry, both as to passenger cars and trucks, and, to some extent with tractors, summarizes the situation at the middle of October as follows:

"I for one—and there are scores of others in the industry who hold the same belief—am firmly convinced that there will be no general automobile buying in northern California until the people are assured that the bottom in prices has been reached. When this bottom is to be reached is a matter for the manufacturers to decide and just how the people are to be convinced that it has been reached, is a difficult problem which the automobile dealers must solve."

Liquidation Complete

Men who have to have automobiles for their business or industrial interests are buying them; others are making their present cars do. There is no doubt about this being the prevailing condition from the Tehachepi Mountains north to the northern boundary of the State, and registration figures indicate that the same condition prevails in southern California.

Indications in general throughout the State are that liquidation is virtually completed that the farmers, and consequently, the merchants and other business men in the agricultural districts, have received a large part of the money for their crops, and dealers and distributors insist that sales will show a much better proportionate figure for the last five months of 1921 than they did for the first seven months. The retail districts undoubtedly are showing some improvement, but whether it be from the fact that money is coming in to the farmers and thus to other buyers, or whether it is the result of intensified selling campaigns during the preceding six months, it is hard to determine.

PHILADELPHIA THEFTS MAKE HIGHEST RECORD

PHILADELPHIA, Oct. 24—Motor cars valued at more than $4,000,000 and numbering 2510 units have been stolen during the year in this city, nearly doubling last year's theft losses here. The year 1921 will stand out as a car theft record year in Philadelphia. Carelessness, police officials assert, is the largest factor in rolling up the record loss of motor cars.

During the period of Jan. 1 to Oct. 31, 1920, 1518 cars were stolen, valued at $2,303,000.

Against the losses reported this year, the figures show 2112 cars, valued at $3,685,348, were recovered. During the same period in 1920, 1651 cars valued at $2,548,-989 were recovered.

Franklin Completes New Inspection Plan

SYRACUSE, N. Y., Oct. 24—The details of the H. H. Franklin Mfg. Co.'s monthly inspection plan for passenger cars are now complete and Franklin dealers are putting it into practice. The various items to be inspected are listed on an inspection report form which has been designed by the company.

No operations other than those listed are undertaken. If any repairs are found to be necessary the matter will be taken up with the owner. A post card form requesting the owner to bring his car into the service station for inspection has also been designed. Three monthly inspections are to be given free of charge after the sale of the car, but a small charge will be made for subsequent inspections.

ATWATER CLOSES DOWN

SOUTHINGTON, CONN., Oct. 24—Practically the entire plant of the Atwater Mfg. Co. has been closed down. The plant has been on a five-day per week working schedule, but because of the small number of orders on hand it was decided to lay off the help until more orders are received. A few men will be employed to keep the machines in condition. The factory has been doing special drop forge work for the Ford Motor Co.

Records Shattered by Goodyear Truck

Makes Better Time Between California Cities Than Do Fast Trains

AKRON, Oct. 24—The Goodyear six wheeled motor truck, the first multiple wheeled motor vehicle to make a transcontinental run from Akron to Los Angeles, has shattered all motor truck records for negotiation of the distance between San Francisco and Los Angeles, according to word received here by officials of the company.

The huge six wheeler made the trip of 420 miles in 14 hours and 40 minutes, at an average speed up and down hill of 29 miles an hour. The truck carried five tons of freight on the trip. The best previous truck record for the distance was made by a 3½-ton truck which averaged 24 miles an hour.

Goodyear officials say the truck made the trip faster than the fast trains of the Southern Pacific Railroad, which take 14 hours and 50 minutes for the San Francisco-Los Angeles trip. On the trip the six wheel truck had to climb a grade of 1700 feet in the first 27 miles, and in the next 40 miles climbed to an elevation of 4230 feet above sea level.

Compared with railroad time for trips of similar distances, it is stated, the Goodyear truck on the basis of its Pacific Coast performance could carry freight from New York to Montreal and deliver it at its destination in only an hour's more time than is occupied by a fast passenger train in going from New York to Montreal.

Based on an average speed of 29 miles an hour, the Mississippi River can be brought within two days' journey by motor truck of either the Atlantic or Pacific seaboard.

The Goodyear truck on its run from Akron to Los Angeles made the distance of 2980 miles in 7 days and 35 minutes of actual running time. This is a new record for the distance. The truck rode on 8 inch tires.

Rost Is President of Richelieu Motors

ASBURY PARK, Oct. 24—The Richelieu Motor Car Corp. announces that its officers and directors are as follows:

President, N. G. Rost, former sales manager of the Duesenberg Motors Corp.; vice president, S. A. Reeves, vice president Merchants National Bank of Asbury Park; treasurer, R. G. Poole, president First National Bank of Farmingdale, N. J.; Donald Symington, president Lock Insulator Co., Gordon Grand, president, New Jersey Registration & Trust Co. of Orange; E. H. Croft, president of the Ker-O-El, Cleveland; W. F. Quinn, president of Quinn & Quinn, Inc., and a member of the New York Board of Aldermen.

Hoover Urges Human Touch in Business

Sends Message to Editors of Business Papers, Who Hold Annual Convention

CHICAGO, Oct. 26—Herbert Hoover, Secretary of Commerce, who has been holding monthly meetings in Washington with the editors of business papers representing all industries, suggested in a message to the editors who are holding their annual convention here this week, that industrial problems be considered from a human rather than a material standpoint. He said:

"I have appreciated the opportunity given me in the monthly meetings to express the policies of the Department of Commerce with regard to some of the pressing industrial questions before us, and I cannot but feel that if these problems are considered as human and not as material questions we can find their solution. . . . There must be in our discussion of these questions the dominating thought that the better control of economic forces is in fact simply the better comfort of the country."

The editors in a symposium on the present status of basic industries gave a vivid picture of industrial conditions.

Steel Future Uncertain

A. I. Findlay, editor of *Iron Age*, reported that the steel industry had turned the corner in July and to-day is at 40 to 45 per cent of its war peak capacity. Since July there has been an increase from 22 per cent to 45 per cent. Prices now are 31 per cent above the 1913 average. The future of the steel industry is still uncertain, he said, but it is expected that production will reach 60 per cent of war peak capacity during 1922.

The electrical industry in certain departments, such as manufacture of motors and meters, is at 60 per cent capacity, and the average consumption of electric current this year exceeds that of 1919, according to F. E. Watts of *Electrical Record*. The sales through electrical jobbers are but 50 per cent of last year. Business has been improving in the last three months.

Building Costs High

In the building construction field building contracts for 1921 are 83 per cent of those for 1913 and construction cost is 34 per cent below the high war peak and 30 per cent less than a year ago, W. W. De Berard of *Engineering News-Record* stated. In such public works as water and sewer enterprises, he said, September of this year was double that of a year ago. He also stated that construction costs are still 80 per cent above the 1914 price level and believes that reduction in labor costs in 1922 will greatly stimulate building.

The leather tanning industry is at 50 per cent capacity, according to James H. Stone of *Shoe Retailer*. Deflations in the leather trade started in 1919. Calf skins, that sold during the war at $1 per pound, brought 13 cents this year. Some grades of cow hides in July, 1921, sold as low as 3 cents a pound.

An interesting angle on the agricultural situation was given by C. V. Gregory of *Prairie Farmer*, who showed that to-day 59 per cent of the farms in the country are unencumbered, and of those that are the value of the mortgage is only 29 per cent of the farm value.

David Beecroft presented a summary of the automotive industries.

F. M. Feiker, assistant to Secretary Hoover, told of the endeavors of the department to effect standardization in all industries in order to reduce living costs.

The value of the business paper to the daily press was analyzed by Glenn Griswold, financial editor of the Chicago *Journal of Commerce*, who looks to the business press for the correct summary of conditions in all industries. The daily press not only asks for such assistance but wants it. Financial editors are now quoting at length from the business press, giving conditions in most industries, and are desirous of going still further in this regard.

Automobile Reimports Show Gain in September

WASHINGTON, Oct. 24—The importation of automobiles from foreign countries into the United States totaled 69, having a value of $97,365, during September, according to an announcement of the Bureau of Foreign and Domestic Commerce. This compares with a total of 201, valued at $191,707, during the same month last year. For the nine months of this year, the importations have been 399, with a value of $698,771, against 746, valued at $794,910, during 1920.

The reimports of automobiles show something of a gain in September of this year over the same period of last year, although this is not true of the nine-month period. The comparative figures are:

	No.	Value
September, 1921	443	$695,586
September, 1920	302	391,170
Nine months, 1921	3,182	5,021,757
Nine months, 1920	4,390	7,196,283

G. M. C. Remains Silent On Scripps-Booth Plans

NEW YORK, Oct. 24—Officials of the General Motors Corp. have declined to make any statement whatever concerning the action taken at their meeting in Detroit last week in reference to the future of the Scripps-Booth division. It is understood that there is a strong probability the company may be sold as a going concern instead of being liquidated. A decision is expected in the near future.

Used Car Trades Cost Indianapolis $193,000

Only Four Dealers Made a Profit, Aggregating $2,300—State Conditions Similar

INDIANAPOLIS, Oct. 22—Thirty-six Indianapolis automobile dealers lost a total of $193,000 in the trading and selling at retail of 2972 used cars since Jan. 1. Only four of 40 automobile dealers realized a profit on the handling of used cars in that same period. Their combined profits aggregated $2,300.

That is the graphic story of the "used car situation" in Indianapolis. It is a pretty fair barometer of the used car situation in the state. In one corner of the state, New Albany, one dealer has 57 used cars on hand. No other dealer in the city has more than 10.

In Evansville, one dealer has 61 used cars; in Terre Haute several have as many as 35. Fort Wayne, Logansport, Lafayette, South Bend, Marion all report one or more merchants heavily loaded. In a few spots where the dealers have been almost 100 per cent in their association co-operation, is the used car situation good, or rather, is not menacing.

Everywhere the dealers are seeking the "answer," which seems to account for the unusual interest that is being taken in the "Indianapolis plan" of harmonizing policies in the trading of cars. One Indianapolis new car dealer had an opportunity to dispose of a used car stock. He exchanged his 14 used cars for a farm of 160 acres in Jackson County.

Gasoline Consumption Reaches High Record

WASHINGTON, Oct. 24—A new high record in gasoline consumption was established in August when 503,000,000 gallons were used, according to an announcement by the Bureau of Mines. Although the average daily production in August of 13,921,000 gallons was 385,000 gallons more than in July, total stocks on Aug. 21 amounting to 567,645,000 gallons showed a decrease of 116,000,000 gallons during the month, according to the figures.

Exports of gasoline in August totaled 47,803,000 gallons, or 75 per cent, more than in July. Total production for the month was given as 131,577,000 gallons.

NO CHANGE IN FRANKLIN

SYRACUSE, Oct. 26—The Franklin Automobile Co. has informed its dealers that the present model, without change, will be featured at both the New York and Chicago shows. The company states that Franklin cars on sale next spring will be of the same design as those now on the market. New York led in sales of Franklin cars for the contract year ending Sept. 1. Chicago was second, Boston third, San Francisco fourth and Los Angeles fifth.

Factories Continue Heavy Production

Output Governed by Sales—Business, in Instances, Exceeds That of Summer

DETROIT, Oct. 25—Despite the fact that all factories are operating strictly on a sales basis, heavy production continues to be the rule, and with some companies, notably the producers of higher priced cars, business is running along as strongly as during the summer months, and in a number of instances better.

This is due in large part to the intensive selling efforts undertaken by the more aggressive factories. In these plants there is to-day a higher priced sales organization than ever before in the history of the industry.

Follow Ford Plan

The Ford organization is, perhaps, the most highly developed, for the reason that Ford went after sales through close field analysis long before most of the other companies realized the value of it. Now, however, the Ford system is being closely followed right through to the highest class field.

Territorial representatives are making their strongest efforts to get business in shape, not so much for the balance of this year as for 1922. Investigations in the field are being carried on to indicate possibilities for next year's business and general satisfaction is expressed at the results disclosed.

Not only are the possibilities of territories being analyzed, but the dealer organizations are being studied to discover their ability to represent the factory fairly in the keen competition certain to develop in the coming year. Factories are working with might and main to strengthen their retail selling forces before the early buying starts.

Every effort at co-operation will be made by manufacturers to prevent flooding the market, but at the same time they will demand that their share of business be gathered in by every representative. No dealer will be assigned more than he can do, but each will be given the definite proposition of meeting the actual business there is for him in his field.

Used Cars Left to Dealers

Factory officials realize that the used car situation has become acute owing to the elimination from the market this year of the usual used car buyer. With a return of better industrial conditions as promised in 1922, this condition is expected to right itself rapidly, and coping with the situation will be left for the most part to the individual dealer.

Factory executives look to the East and the South as the big sales field for 1922, with a good steady business in the Mid-West and on the Pacific Coast. More attention will be paid to the selling of first car owners than at any time in the industry, producers realizing that sane progress can only be made by enrolling new owners.

Oakland on New Schedule

Oakland Motor Car Co. will enter upon a schedule of 100 cars a day in November, after a lull in manufacturing in the last two weeks of October. During this period the factory organization has been reduced to a minimum, but officials declare that this action was taken because of factory conditions rather than a lack of business.

In restarting upon a heavy schedule, officials say that this has been necessitated by increased business in all parts of the country, the East and South leading. All models are included in the orders, with a predominancy toward the enclosed. With the scheduled business November is expected to exceed September, which had been the record month of the year.

Despite conditions in October it was said this month will show a large increase over business in October, 1920.

Packard Motor Car Co. in the two days immediately following its price reduction on the single-six model, reports shipments averaging 200 cars a day. The sales response has been general, officials declare, orders not being limited to any one section of the country. Enclosed cars are meeting with biggest demand. Of 339 cars shipped yesterday, 159 were sedans and 39 coupes.

INAUGURATE BUS LINE FOR LONG DISTANCES

CHICAGO, Oct. 24—A new idea in long distance transportation of tourists by means of motor buses was put into effect yesterday by the T. & S. Tourist Co. of this city when it started four White 10 passenger buses and a fleet of privately owned touring cars for New Orleans.

The caravan will cover 1135 miles on the journey from the Great Lakes to the Gulf. There will be a one-day stopover at Mammoth Cave and sight seeing tours in the principal cities along the way. Entertainments by Chambers of Commerce and civic organizations will be provided in all the larger places. The caravan is scheduled to reach New Orleans Nov. 2.

KELSEY INFRINGED PATENTS

DETROIT, Oct. 26—Federal District Court here has decided patents of the Universal Wheel Co. have been infringed by the Kelsey Wheel Co. The decision affects royalties on rims manufactured by Kelsey prior to 1917, according to Kelsey officials. An appeal to the Supreme Court will be taken. John Kelsey, president, says the total sum involved is nominal and has been covered by a reserve for some time.

Says New York Thefts Are Largely Frauds

Loose Insurance Methods Blamed in Survey Made by City Official

NEW YORK, Oct. 25—The startling statement that 80 per cent of the automobiles reported stolen in this city are fictitious or were disposed of for the purpose of collecting insurance on them was made by David Hirshfield, commissioner of accounts, in a report on an investigation into automobile insurance ordered by Mayor Hylan. He declared he had discovered that automobile insurance companies made no effort to learn whether an applicant for a policy actually owned a car or whether his car was of the value stipulated in the policy.

Companies Are Lax

Hirshfield stated that one of his agents applied for a $500 policy on an automobile that never existed. A few days later he received the policy. This incident was followed by another of the same character in which a policy for $700 was issued by another company. A similar plan was tried a third time with a third company with equal success, according to Hirshfield.

The commissioner asserted that although the three policies had been issued more than six weeks no official from any of the insurance companies had called on the policy holders to request an inspection of the cars.

"There was a report the other day," Hirshfield stated, "to the effect that 160 cars were stolen in this city in 12 days. My investigation convinced me that most of these cars were not stolen at all. The owners of many of them, I believe, merely threw them into the river or disposed of them in places outside of the city and then collected insurance on them. Such loose methods on the part of insurance companies are a temptation to the dishonest."

Johnson Motors Formed Through Consolidation

SOUTH BEND, IND., Oct. 26—Consolidation of the Johnson Motor Wheel Co. of Indiana and the Quick Action Ignition Co., both of this city, as the Johnson Motor Co. of Delaware has been completed. While substantial orders for the old lines are being received, the company is developing a light twin cylinder outboard motor which will fill in between seasons.

Operations are directed by Charles Kratsch as vice-president and general manager. He formerly was manager of the Sumter division of the Splitdorf Electrical Co. His chief assistant is P. A. Tanner, former secretary of the Splitdorf company, for which he developed a service organization.

Albert Erickson is in charge of experimental and development work but L. J. Johnson remains as head of the engineering department.

Orders Public Sale of Owen Magnetic

Will Be Sold in Lots If Offering as Unit as First Made Is Unsuccessful

WILMINGTON, Oct. 24—Receivers for the Owen Magnetic Motor Corp. have been directed by a court order to sell at public auction all the assets of the company at the main offices at Forty Fort, Luzerne County, Pa., at 11 a. m., Nov. 5. The sale will include land, buildings, parts and materials.

The plant consists of a one-story concrete building of saw tooth construction, 600 x 80 ft., and another of the same construction 264 x 80 ft., as well as a frame structure 109 x 46 ft. used as a stockroom. There are several smaller buildings. The machinery and tools are of the latest design and include equipment of all kinds. The inventory consists of large stocks of parts, a considerable portion of which can be used only in the manufacture of the Owen Magnetic car or one of similar design, as well as large quantities of high grade steel.

The property will be offered first as a unit, and if there are no bidders it will be sold in lots.

After the assets are sold, proceeds will be divided among the creditors at the direction of the court and the affairs of the company will be wound up.

Locomobile Changes Personnel of Branches

BRIDGEPORT, CONN., Oct. 25—Several changes in the personnel of the Locomobile Co. have been made since the return of former executives to their old posts. They have resulted from a decision by the company to merchandise through its own factory branches.

Locomobile branches have been reestablished in Los Angeles under the direction of T. D. Swayne and in San Francisco under C. A. Kingsley. C. R. Norton, who has been in charge of both these branches with headquarters in Los Angeles, has been relieved.

Similar changes have been made in the Chicago organization and W. S. Porter has returned to that city from the Boston branch, where he was general manager. He succeeds H. S. Norton.

W. S. Horner has succeeded Oscar Coolican as branch manager in Philadelphia.

McGraw Is Readjusted with New Directorate

CLEVELAND, Oct. 27—Readjustment of the financial affairs of the McGraw Tire & Rubber Co. has been completed by the reorganization of the board of directors to include representatives of banking interests and merchandise creditors who will co-operate with the management in the conduct of the business. The plan does not call for any change in the company personnel or new financing.

President John Morgan states that a satisfactory settlement has been made on all merchandise contracts. Indebtedness to banks and merchandise creditors has been reduced $400,000 since the plan became operative. Discounts are being taken on current purchases and the company has ample cash to provide working capital. The McGraw plant is now operating two 10 hour shifts and it is asserted that orders on hand soon will necessitate an increase in production.

Census Bureau Issues New General Schedule

WASHINGTON, Oct. 24—Director of the Census William M. Steuart has issued the general schedule for manufactures for the census of 1921 which was prepared in co-operation with the committee created at the July conference in Washington of trade and craft associations with Secretary of Commerce Herbert Hoover and officials of the census bureau.

Because of its simplicity the new schedule differs from past schedules and also varies with regard to the amount of information called for. As outlined the new schedule covers the following items: Names and particulars of establishments as to location and lines of products; persons employed as salaried employees, including managers, clerks, etc., and total salaries paid; wage earners, including piece workers and total wages paid; time and operation and products which will be detailed for the particular industries.

J. Walter Drake of the National Automobile Chamber of Commerce represents the automotive trade in its relations with the Department of Commerce in this activity.

BRISCOE & STAHL ENLARGES

DETROIT, Oct. 26—The Briscoe & Stahl Co. has increased its capitalization to $205,100 and will enlarge its consulting engineering business to include representation of foreign companies in the automotive field both as buying and selling agents. The consulting work of the company will also be extended to include other fields than automotive. The officers of the company are Benjamin Briscoe, formerly of Briscoe Motor Co., Jackson, Mich., and Rodalphe Stahl.

WILLYS SHIPS 86 CAR LOADS

TOLEDO, OHIO, Oct. 24 — Eighty-six carloads of Overland and Wiliys-Knight cars have been shipped from the factory here in a solid train to Los Angeles. The value of the shipment has been placed at $547,000.

DRUMPLEMAN LEAVES HUDSON

DETROIT, Oct. 27—W. J. Drumpleman, for three years assistant sales manager for the Hudson Motor Car Co., has been appointed assistant to Eddie Rickenbacker, director of sales, advertising and service of Rickenbacker Motor Co.

Durant Engine Order Increases Employees

Continental Will Add 2,000 Men at Muskegon Through $12,000,000 Contract

DETROIT, Oct. 26—Orders for $12,000,000 in engines placed by Durant Motors with the Continental Motors Corp. will result in the addition of 2,000 men to the force at the Muskegon plant. Production on the new orders will be started at once, first deliveries being to Long Island City and later to Lansing, Oakland, Cal., and Toronto as those plants get into production. The Lansing factory begins operations in November.

Engines have been going forward to the Long Island City plant for some time on a tentative contract basis. With the Durant business and the general improvement in automobile sales, Continental expects to have the Muskegon plant on 100 per cent operation basis by summer.

The engine is a special type designed by Durant engineers which will be made to specification by Continental. These will be Fours exclusively. The Durant Six will be made by Ansted as stated recently.

Automobile Shortage Is Seen in Australia

WASHINGTON, Oct. 24 — Recovery has been made in automotive exports in several sections of the world, according to Gordon Lee, chief of the automotive division of the Bureau of Foreign and Domestic Commerce. Because of present demands, he states, there will be a shortage of automobiles in the district served by Melbourne, Australia, as an automotive distributing center.

Lee also states that there is a recovery in South Africa where gradually improving conditions are being reflected in car sales both to dealers and users, and where conditions are reported as approaching normal. Comment is also made on the fact that that automotive exports to Mexico of passenger cars for the first eight months of the current year totaled 4,753 as against 1,955 for the corresponding period of last year.

Hoover Asks Industry for Advisor in Strike

DETROIT, Oct. 27—Secretary of Commerce Hoover has asked the automotive industry to designate a representative to act as his adviser in connection with the mobilization and allocation of motor trucks in the event of a railroad strike. It is understood that Roy D. Chapin, president of the Hudson Motor Car Co., and an officer of the National Automobile Chamber of Commerce, may accept the appointment as a patriotic duty to assist the nation as was done during the war.

Prices of Hupmobile Return to Old Level

General Cut Made in May Followed by Partial Reductions In September

DETROIT, Oct. 26 — A downward revision has been made in Hupmobile prices by the Hupp Motor Car Corp. A general cut in prices was made last May and in September there was a further reduction in the coupe and sedan. The reductions are as follows:

	Old Price	New Price
2 passenger	$1,485	$1,250
5 passenger	1,485	1,250
Coupe	2 200	2,100
Sedan	2,250	2,150

With this revision prices are now down to the 1917 level.

BRITISH FORD DROPS

LONDON, Oct. 4 (*By Mail*)—For the second time within a few months Ford prices are down, this time from £5 to £65, the average rate being £30. While this step is approved by the public and ultimately by dealers, the latter are affected through its not being the Ford practice to credit dealers with these reductions on unsold stock. The price of the Fordson tractor was recently cut to £205 from £225.

COLE IS $65 LOWER

INDIANAPOLIS, Oct. 24—The Cole Motor Car Co. announces that effective Oct. 27 its model No. 870 touring car will sell for $2,485. This is a reduction of $65. The prices on all other models have been reduced accordingly.

Federal Price Cuts Average 22 Per Cent

DETROIT, Oct. 25—Price cuts running as high as $850 are announced by the Federal Motor Truck Co. The average is about 22 per cent on all models and the reduction is the fourth within the last two years. The prices follow:

	Old Price	New Price
1 ton	$2,500	$1,800
1½ ton	2,775	2,175
2 ton	3,025	2,425
3½ ton	3,950	3,150
5-6 ton	5,350	4,550

Reductions of $600 and $800 have been made on the light and heavy duty tractors.

NEW THOMART PRICES

KENT, OHIO, Oct. 24—The Thomart Motor Co. has reduced its price on the Akron Multi truck, model 20, capacity 1¼ tons, from $1,995 to $1,695.

HART-PARR REDUCES

CHARLES CITY, IOWA, Oct. 26—Effective Nov. 1, the Hart-Parr Co. will make a substantial reduction in the price of both models of its tractors. The price of the Hart-Parr "30," which for the past year has retailed at $1,595 f.o.b. factory, is now listed at $1,295, cash, f.o.b. factory. The Hart-Parr "20," which was reduced June 1 from $1,195 to $995 cash, is now listed at $945 cash, f.o.b. factory. These prices are the lowest at which these Hart-Parr tractors have ever been sold.

6-Cylinder Packard Makes $625 Reduction

DETROIT, Oct. 24—The Packard Motor Car Co. announces a reduction of $625 in the prices of all models of its six-cylinder car, effective to-day. The prices follow:

	Old Price	New Price
2 passenger touring	$2,975	$2,350
5 passenger touring	2,975	2,350
Coupe	3,750	3,125
Sedan	3,975	3,350

When the single six was brought out a year ago the price was $3,640. This was reduced to $2,975 on Nov. 1, 1920. The new price therefore represents a reduction of $1,290 in less than a year. The price of the sedan was reduced on July 5 last from $4,250 to $3,975.

No change has been made in the price of the twin six models.

DIAMOND T CUTS

CHICAGO, Oct. 25—Price reductions announced by the Diamond T Motor Car Co. on all its models are as follows:

	Old Price	New Price
1 ton	$2,500	$1,975
1½ ton, model F S	2,960	2,525
1½ ton, model T	2,650	2,250
2 ton	3,285	2,650
3½ ton	4,675	3,750
5 ton, model E L	5,400	4,325
5 ton, model S	5,650	4,500

STERLING REDUCES

MILWAUKEE, Oct. 25—The Sterling Motor Truck Co. announces the following price reductions:

	Old Price	New Price
1½ ton	$3,200	$2,885
2 ton	3,500	3,085
2½ ton	3,650	3,290
3½ ton	4,600	4,325
5 ton, model 5W	5,500	4,950
5 ton, model 5C	6,000	5,500
7½ ton	6,500	6,000

REDUCE HAL-FUR TRUCKS

CLEVELAND, Oct. 24—The Hal-Fur Motor Truck Co. announces the following downward revision in its prices:

	Old Price	New Price
1½ ton	$2 350	$2,200
2½ ton	3 250	3,000
3½ ton	4,250	4,000

ATLAS PRICE DOWN

YORK, PA., Oct. 24—The Atlas Truck Corp. announces a reduction in its 1-ton model from $1,550 to $1,185.

G. W. W. TRUCK REDUCED

HENDERSON, IOWA, Oct. 26—The Wilson Truck Mfg. Co. has reduced the price of the G. W. W. truck, 1½-tons, from $2,100 to $1,950.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

During the past week the local money market has shown signs of marked ease. The week's range for call money was 4 per cent to 5½ per cent in comparison with a range of 5 per cent to 6 per cent for the previous week. Renewal rates ranged from 4 per cent to 5½ per cent with 4½ per cent ruling, and accommodations were arranged in the "outside" market at as low as 3½ per cent.

There was also an easier undertone in time money, 60 and 90 day paper being quoted at 5¼ per cent to 5½ per cent, as against a uniform rate of 5½ per cent in the previous week. The longer maturities up to six months were quoted at 5½ flat as against a range of 5½ per cent to 5¾ per cent in the previous week. The market in general continued quiet with few, if any, important transactions recorded. Prime commercial rates remained unchanged at 5½ per cent to 5¾ per cent.

The Federal Reserve Bank statement as of Oct. 19 showed that both the Federal Reserve System and the New York institution have strengthened their positions materially, each showing large gains in gold reserves and contractions in bill holdings. The Federal Reserve System showed a total reserve ratio of 70.3 per cent as compared with 68.5 per cent the week before. Total gold reserves stood at $2,772,721,000, an increase of $43,799,000 over the figure for the previous week, and the high point for the year, the low having been $2,080,262,000 on Jan. 7.

Federal Reserve notes in circulation decreased $35,449,000, the actual amount in circulation as of Oct. 19 being $2,440,862,000, the low point for the year. Total bills on hand showed a decrease of $79,723,000 from the previous week, while bills discounted secured by United States obligations amounted on Oct. 19 to $459,671,000, the low point for the year. Total earning assets at $1,577,900,000 showed a decrease of $102,303,000, a record low for the year, and a decrease of 53 per cent below the total reported about a year ago.

The total gold reserves of the New York Federal Reserve Bank increased $74,735,181 to $1,033,149,181. Total earning assets decreased $89,000,000, and the total of bill holdings declined to $272,619,000, a contraction of $71,347,000.

ARGENTINE OUTLOOK BRIGHTENS

BUENOS AIRES, ARGENTINA, Sept. 28 (By Mail)—The American Chamber of Commerce here feels that a great improvement has taken place in general business conditions during the last two months. In discussing the present situation, M. T. Meadows, manager of the Chamber, said: "Frankly, I feel that the corner has now been turned and at last we are in a position to expect a slow but steady return to satisfactory business conditions."

MEN OF THE INDUSTRY

George Drake Smith has been appointed general sales manager for trucks by the Steinmetz Electric Motor Car Corp. of Baltimore. To accept this position Smith has resigned as vice-president, director and general sales manager of the Winther Motor Truck Co., Kenosha, Wis. For several years he was with the General Vehicle Co., which manufactured electric trucks, and later was with the Edison Storage Battery Co, at Orange, N. J., as manager of its electric vehicle department. He has an acquaintance which extends from coast to coast. It is expected that the Steinmetz truck, after two or three years of development, will be in production about Dec. 1. It is said to be lighter than any similar truck on the market and to have unusually high speed, as well as simple design.

Richard H. Magoon has joined the sales department of the Leach Biltwell Motor Car Co. of Los Angeles as assistant to Charles Hagenios, sales manager. **T. A. Heinold,** for a number of years assistant manager and purchasing agent of the Miller Engine & Foundry Works of Los Angeles, has joined the Leach organization in the capacity of assistant purchasing agent. The Miller plant and organization was recently taken over by the Leach company. **Forrest P. Richardson,** a director of the company and purchasing agent, recently was named assistant general manager of the company, but will continue to head the purchasing department.

Ralph D. Mock, vice-president and former comptroller of the Hydraulic Steel Co., Cleveland, has become vice-president associated with sales. Mock, prior to his nine years of service as finance executive for the company, had a broad experience in sales work. **Harry W. Kranz,** former superintendent of the Cleveland Welding & Mfg Co. of the Hydraulic company, has been appointed manager of the welding plant. **Charles S. Holden,** formerly in the sales department of the Cleveland company, has been named sales manager of the welding plant.

Brock Mathewson, one of the veterans of the automotive industry, has taken up his duties as vice-president and sales manager of the Reynolds Spring Co. at Jackson, Mich. He has abandoned his original plan of building up a manufacturers' representative service in Detroit. Mathewson came into the automotive industry back in the bicycle days. During the war he was connected with the automotive division of the Savage Arms Co. in an executive capacity.

F. E. Badger, for the past ten months a member of the sales-engineering staff of the Detroit Steel Products Co., manufacturer of Detroit Springs, has been appointed sales manager of the chassis spring division of that company. For eight years Badger was plant manager of the Standard Parts spring plant, at Flint. Following the war he was general manager of the spring plant at Canton, Ohio.

E. E. McCleish, formerly director of publicity and publications for the Willys-Overland Co., who recently built up an advertising and sales copy business of his own, has combined his business with that of the United States Advertising Corp., of which Ward Canaday is president. McCleish came to Toledo from the Curtiss Aeroplane and Motor Corp. in Buffalo.

Richard B. Mann has been appointed general manager of the Packard Motor Car Co. of Missouri, with headquarters at St. Louis. Alvan Macauley is president, succeeding P. S. Russel who resigned; and Dr. H. H. Hills is vice president. Mann has been connected with the Packard in Newark and New York.

E. W. Hiatt has joined the organization of the A. B. B. Sheet Metal Works, Milwaukee, in the capacity of factory manager. Hiatt was formerly with the Maxwell-Briscoe Co., serving as superintendent in the body and steel metal department. More recently he was connected with the Dort Motor Car Co. in a similar capacity.

N. T. Norton, Jr., who recently resigned as chief engineer of the Motor Transport Division of the Quartermaster Corps, U. S. A., is now designing a new line of truck axles to be marketed by a company that is now being formed. Norton's offices are in the Monadnock Building, Chicago.

Ben G. Campbell has been named southwest sales manager of the Anderson Motor Co. of Rockhill, S. C. For eight years Campbell was connected with General Motors. Since 1919 he has been analyzing trade territories west of the Mississippi for a number of concerns in the industry.

Hans Renold of Birmingham, England, who is one of the large chain manufacturers in that country, is now calling on bicycle, motorcycle and truck builders in the United States. It is understood he contemplates starting an American factory to make roller chains.

Harry Tipper, business manager of AUTOMOTIVE INDUSTRIES, will address the students of the engineering classes of Purdue University at Lafayette. Ind., the afternoon of Oct. 31. He will speak to the Lafayette Rotary Club earlier in the afternoon.

M. B. Loomis, advertising manager of the Sparks-Withington Co., Jackson, has returned from a three weeks' trip covering eastern jobbers. He finds business good, with jobbers clearing their stocks and buyers buying.

LeRoy Kramer has been elected president of the Rochester Motors Corp., Rochester, N. Y., and C. J. Symington, president of the T. H. Symington Co., has been named chairman of the board of the Rochester corporation.

Allan C. Chambers, formerly sales manager of the Russel Motor Axle Co., Detroit, has been appointed sales manager of the Hartford Automotive Parts Co., Hartford, Conn., with headquarters, for the present, in Detroit.

William N. Freeman, for some time secretary of the Fisk Rubber Co., Chicopee Falls, Mass., has been made assistant sales manager of the company's Federal division with headquarters in Cudahy, Ohio.

C. A. Thurston, export manager for Earl Motors, Inc., has sailed for England, where he will visit the Olympia Show. He also plans a trip to various countries of the Continent.

O. W. Williams, for the last four years in charge of material and costs with the United States Motor Truck Co., has been appointed to the position of purchasing agent with the company.

Wilson S. Porter has returned to Chicago as manager of the Locomobile Co.'s branch, succeeding H. S. Norton. Porter recently was Boston branch manager.

C. J. Morrison, for the past two and a half years executive assistant to the president of the Atlas Tack Corp., has resigned.

John T. Turcott has been appointed general superintendent of Stevens-Duryea, Inc., Chicopee Falls, Mass.

W. H. Herbert has been appointed sales manager of the Denby Motor Truck Co., Detroit.

FINANCIAL NOTES

Durant Motor Car Co. of Canada, Ltd., soon will offer to the public $1,250,000 of $10 par value stock. W. C. Durant and his associates already have taken $750,000 of the $2,000,000 authorized stock. The shares will be convertible in Aug., 1924, into capital stock of the parent company on a basis of $30 for the United States stock and par for the Canadian. It is expected that production in the Toronto factory will commence by the end of the year and that the first cars will be marketed in the Dominion about March 1.

Russel Motor Car Co., Toronto, profits for the year ended July 31 were $158,124 compared with $339,453 the previous year. Business was uneven among the various subsidiaries and on the whole the company experienced the uncertainties of present conditions. The balance sheet shows a reduction in bankers' advances from $500,000 to $120,000. Accounts and bills payable have also been reduced, standing now at $89,947 against $416,025 a year ago.

Stewart-Warner Speedometer Corp., net profits for the quarter ended Sept. 30, before provision for Federal taxes, were $552,894, against $801,278 a year ago, and for nine months totaled $755,967, against $2,271,426 in the corresponding period of 1920. Inventories now have all been marked down to market. The corporation declared the regular quarterly dividend of 50 cents a share, payable Nov. 15 to stock of record Oct. 31.

Stanwood Rubber Co.'s plant at Elizabeth, N. J., has been sold in Chancery Court at Newark for $360,000, thus terminating the receivership. The reorganization plan calls for issues of $175,000 8% pfd. stock, $151,000 8% 2nd pfd., 500,000 shares no-par common. Creditors' $600,000 claims will be paid 50% in non-interest bearing debentures and 50% in common stock of $2 par.

Durant Motor Co. of Indiana, with a capital of $3,000,000, has been incorporated at Indianapolis. It is to manufacture the Durant Six in Muncie, in the Sheridan plant, purchased from the General Motors Corp. three months ago. The company will have 800 men employed by Jan. 1 and ultimately expects 4,000 on its payroll.

Sinclair Motors Corp., Springfield, Mass., will pay a dividend of 3 per cent to all creditors through an order by Referee in Bankruptcy Charles W. Bosworth. This is the first dividend declared since the company was adjudicated a bankrupt.

Ford Motor Co. of Canada will pay a cash dividend of 15 per cent on Nov. 15. The disbursement will total $1,050,000 and will be the second cash dividend of that amount paid by the company in the last six months.

Briscoe Motors Corp. of Jackson, Mich., has filed an amendment to its charter, which was issued in Delaware, changing its name to Earl Motors, Inc., and increasing its capital from $21,500,000 to $41,500,000.

Lee Rubber & Tire Co. has declared its regular quarterly 50 cent dividend, payable Dec. 1 to stock of record Nov. 15.

PORTUGAL HONORS CASE

RACINE, WIS., Oct. 24—Information has been received by the J. I. Case Plow Works Co. that the Portuguese Farmers' Association has bestowed its gold medal and first honor prize for the best agricultural machinery group at the Lisbon exhibition upon Monteiro Gomes Limitada, handling the distribution of Case implements in Portugal and Spain.

INDUSTRIAL NOTES

New England Tire & Rubber Co., South Holyoke, will start production this week in its new plant, and expects to attain an output of 300 pneumatic and cord tires a day within two months and have 200 employees at work. Capacity of the factory is 1,000 tires and 1,500 tubes daily. Up to the present the company has had its product made under contract by a Brooklyn concern, and has produced $1,000,000 worth of tires in the last year. A factory branch has been opened in Washington, in addition to the branches previously established in New York, Newark and Boston.

United Automobile Body Co. will begin production early in November in the plant at Danville, Ill., formerly occupied by the Moore Motor Vehicle Co. The general offices will be opened with the transfer to that city of R. M. Hawn, chief engineer; E. W. Windsor, sales production manager; and William R. House, sales manager. It is the intention of the company to divert all production to the main plants at Danville and Springboro, this policy decreasing the overhead and supervisory expense. Later, if conditions warrant, the other branches may be given more activity.

Perfection Tire & Rubber Co. stockholders attended a mass meeting at Peoria, Ill., to allow President Preston E. Roberts and General Manager James Rosenthal an opportunity to give first hand information concerning the activities of the company. It was stated that $2,000,000 of Peoria money, invested in the company, was secure, and that the plant at Fort Madison, Iowa, is operating upon full time. Following the statements confidence was expressed in the policy and methods of the executives.

Mirrorlike Mfg. Co., is moving to its new plant, Queensboro Boulevard and Buckley street, Long Island City, which has been especially constructed for the manufacture of the company's products. The plant will permit of a ten-fold increase in business. Additional land will allow further facilities as needed. The company has added a special department for the manufacture of greases, soaps, motor oils, etc.

The Morand Cushion Wheel Co. has bought a 20-acre site in Chicago upon which it expects, as soon as local building conditions permit, to build a new factory to cost in the neighborhood of $1,000,000. The new plant will be modern and complete in every respect, embracing rubber making, woodworking and foundry departments. Business with this company is reported good and the future very bright.

Glenwood Motor Co. has made arrangements to locate its main plant at Findlay, Ohio. It is a Cleveland concern and was organized three years ago. Work on a new factory building on a 25-acre site in North Findlay will start soon. The Greater Findlay Corp., capitalized at $100,000, has been formed by local capital to provide housing accommodations for the men employed by the motors corporation.

El Dorado Motor Device Co., which has been incorporated with $100,000 capital stock, will maintain a factory at El Dorado, Ark., for manufacturing anti-kicking devices, and attachments for motor and gasoline engines. J. G. Pratt is the president; Ed. Combs, vice-president; O. A. Heath, secretary, and G. M. LeCroy, treasurer.

Commercial Car Co., of Detroit, has purchased the plant and properties at Knoxville, Tenn., of the Southern Valve & Gear Co., for conversion into a truck manufacturing plant. The deal was consummated by F. E. Fitzgerald of Detroit general sales manager for the company.

Columbia Tire & Supply Co., Lafayette, Ind., has changed its name to the Columbia Automobile Supply Co. and has removed to larger and more complete quarters. The changes do not involve any alteration in the personnel of stockholders or management.

New Britain Machine Co., New Britain, Conn., will shortly begin the production of motor cycles, according to a statement by company officials. Nothing definite is said as to the type that will be manufactured. Business in the tractor department is quiet.

Porter Rubber Co.'s plant at Salem, Ohio, has been sold to L. W. Hicks, Pittsburgh, for $73,000, the sale including the entire equipment. The plant was sold to satisfy a judgment for $85,000 entered in the Common Pleas court of that city in favor of Hicks.

Kelly-Springfield Motor Truck Co. force at Springfield, Ohio, is being gradually increased with skilled men. Orders are coming in from dealers and the outlook is growing more encouraging, James L. Geddes, chairman of the board of directors, states.

S. F. Bowser & Co., manufacturer of oil tanks and pumps, which has been operating on part time during the summer will resume on full time Nov. 1. A wage cut amounting to from 10 to 15 per cent will be put into force.

Robert H. Hassler Co., Inc., of Indianapolis is planning the construction of a two-story brick and steel building which will be used as an addition to its plant for the manufacture of automobile shock absorbers for larger cars.

Easthampton Cork Co., Easthampton, Mass., has opened a shop for the manufacture of cork sheets for automobile gaskets, starting with contracts that assure the operation of the plant for a year and a half.

Fisk Rubber Co., Chicopee Falls, Mass., has made a reduction of 100 in the night shift of its tube department for the reason that tube production has been running ahead of tire work.

Lightning Chain Auto Wheel Corp. has purchased property in Rochester and will begin manufacturing the Roblin demountable rim retaining device by Nov. 1.

Paragon Motor Co., Cumberland, Md., has awarded a general contract for the superstructure of its new plant. Foundations for the plant have already been laid.

The Buda Co. announces that the office of the eastern sales manager has been removed from 33 West 42nd street, New York to 30 Church street.

Non-Explosive Appliance Co., Fort Wayne, has created a sales and advertising department, which will be headed by W. H. Minchin.

JOHN BOYD DUNLOP DIES

NEW YORK, Oct. 25—A dispatch from Dublin says that John Boyd Dunlop, known as the inventor of the pneumatic tire, died there yesterday at the age of 81 years. His invention, first introduced in 1888, made bicycling popular and was a forerunner of passenger automobiling. Dunlop, who was a veterinary surgeon, was led to develop the pneumatic tire through his devotion to his invalid mother who was compelled to use a wheeled chair. He hit upon the use of inflated rubber tubes around the wheels of his mother's chair to make it more comfortable for her.

METAL MARKETS

In view of the U. S. Steel Corporation's loudly proclaimed $7 cut in its rail price, those steel producers who are constantly essaying price advances would at first blush seem to be hopelessly out of step. The facts in the case, however, serve to modify this impression. The cut in steel rail prices was one of those brilliant moves which the master hand that guides the Corporation's destinies can always be relied upon to make when opportunity offers to improve the Corporation's relations with the public.

Choosing the psychological moment when labor's balking at unavoidable wage cuts threatened to dislocate the nation's business, Judge Gary resorted to this step so as to impress upon the American people the readiness of the country's largest corporation to "take its medicine" with a smile. Marketwise, however, the announcement was as devoid of significance as it was important from a public affairs point of view.

Rails have always been considered apart from other steel products and for upward of a dozen years before the war has sold at the quasi-stabilized price of $28. When the downward revision of steel prices began last December, it was commonly understood that the reason no change was announced in the price of rails from the $47 quotation, which had been inherited from the Industrial Board's price schedule, was that the railroads were in no position then to place orders for rails and that readjustment of the rail price could well wait until the carriers were once more financially on their feet.

The $47 rail price was generally recognized as an unmeaning nominal figure, so that its lowering by $7 must not be interpreted as signifying even in the remotest manner a tendency on the part of the leading producing interest to put into effect other price reductions. In fact, there is at the present time in evidence a total absence of the determined leadership that characterized the steel market in its heyday. The largest producing interests appear to have their misgivings as to the possibility of maintaining any sort of price policy and seem perfectly willing to have some of the more aggressive "independents" try their luck with advances as a means of bringing out orders at the old prices and "sugaring" averages.

Pig Iron.—Buying and prices are tapering off, many consumers holding off in the expectation of early cuts in freight rates. Steel mills are again sellers of surplus production of pig.

Steel.—Non-integrated sheet mills have been buying modest tonnages of sheet bars for which they have had to pay higher prices. The sheet market is irregular. Passenger car builders are buying odd tonnages of cold-drawn and strip steel to piece out what stocks they have on hand so as to maintain their production schedules over the year's remaining two months. Bolts and nuts are moving in a routine way only.

Aluminum.—As intimated in previous market reports, German interests have advanced their prices on sheets to the extent of 2 cents per lb., regular selling agents now quoting 30¢ @ 31¢ base on flats and coils and 33¢ on circles. No ingots are offered by the Germans. The Aluminum Co. of America has reduced its price for sheets about 4¢ a pound, bringing flat sheets 18 gauge and heavier to 35¢ and coil to 30¢.

Copper.—The flurry in the copper market has apparently spent itself and bargains are once more offered and spurned.

Calendar

SHOWS

Nov. 14-19—Jersey City, Second Annual Automobile Show of Hudson County Automobile Trade Association. Fourth Regiment Armory.

Nov. 27-Dec. 3—New York, Automobile Salon, Hotel Commodore.

January — Chicago, Automobile Salon, Hotel Drake.

Jan. 7-13—New York, National Automobile Show, Madi-Automobile Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 28-Feb. 4 — Chicago, National Automobile Show, Coliseum, Auspices of N.A.C.C.

Feb. 6 to 11 — Seventh National Tractor Show and Educational Exposition, Minnesota State Fair Grounds, Minneapolis.

Feb. 6 to 11 — Winnipeg, Can., Automotive Equipment Show, Western Canadian Automotive Association.

Feb. 20 to 25—Louisville, Ky., Louisville Automobile Show, Auspices Louisville Automobile Dealers Association.

FOREIGN SHOWS

Nov. 4-12—Car Show. Nov. 28-Dec. 3—Motorcycle Show.

Nov. 4-12 — London, British Motor Show, Society Motor Mfrs. and Traders.

Nov. 7-14—Paris, Seventh International Exposition of Aerial Locomotion in the Grand Palais of the Champs Elysees, Held by the Chambre Syndicale des Industries Aeronautiques.

Nov. 12-27—Buenos Aires, Annual Motor Show, La Pabellon de las Sosas, Automovil Club Argentino.

Nov. 26 - Dec. 3 — Shanghai, China, Automobile Show.

March, 1922 — Santiago, Chili, Annual Automobile Show.

May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador. Automotive Section.

Sept. 1922 — Rio de Janeiro, Brazil, Automobile exhibits in connection with the Brazilian Centenary Associcao Automobilista Brazileria.

CONVENTIONS

Oct. 28—New York, American Iron and Steel Institute.

Nov. 1-4—New York, Industrial Relations Association of America.

Nov. 3—Indianapolis, Meeting of Friction Drive Engineering Society.

Nov. 14-19—Chicago, Annual Meeting and Business Exhibit of Automotive Equipment Association.

Nov. 15-16—New York, Convention of Factory Service Managers, National Automobile Chamber of Commerce.

Nov. 21-23—Atlanta, Third Annual Convention of American Farm Bureau Federation.

Dec. 6-8 — Chicago, Second Annual Meeting of American Petrolum Institute.

Dec. 10—New York, American Institute of Mining and Metallurgical Engineers.

Dec. 20—Philadelphia, American Society of Mechanical Engineers.

Dec. 27-29—Chicago, American Society of Agricultural Engineers, Auditorium Hotel.

Jan. 17-20, 1922—Chicago, American Road Builders Association.

Sept. 18-23, 1922—Rome, Italy, Second Annual Meeting of the International Chamber of Commerce.

S. A. E. MEETINGS

Detroit, Nov. 18, Dec. 23, Feb. 24, March 24, April 28, May 26.

New York, Jan. 11-14, 1922—Annual Meeting.

Chicago, Feb. 1

Minneapolis. Feb. 8—Tractor Meeting.

Ready to Produce New Maxwell Series

Frame Is Stronger and Redesigned —4-Cylinder Engine Little Changed

DETROIT, Oct. 24—The Maxwell Motor Car Co. is about to enter production on its new series. The changes are principally in the larger and more substantial bodies and a stronger and completely redesigned frame. The same four-cylinder engine is employed with only minor changes. In exterior appearance, the car has been substantially improved. The radiator is higher and larger.

The bodies have been refined from one end to the other and mechanical improvements include the adoption of Alemite chassis lubrication, easier clutch and brake action, longer springs, new mounting of starting motor on the bell housing and new type of tire carrier.

Probably the outstanding feature of the new series is the superior trim and fitting of the new bodies. Real leather upholstery is used in the open cars and special broadcloth in the closed. The seat and back cushion springs are greatly improved. All doors are provided with pockets and the side curtains open with the doors on solid rods and supports. There is a plate glass window in the rear curtain of the open cars and the equipment now includes the drum type of headlamp, motor-driven horn, better set of tools and better body hardware. The new 31 x 4 cord tire is employed which helps to make the car lower. Prices have not yet been fixed.

Wills-Sainte Claire Line Gets Sedan Addition

MARYSVILLE, MICH., Oct. 24—C. H. Wills & Co. is now making deliveries on a sedan which is the latest addition to the Wills-Sainte Claire cars. There are two auxiliary seats that fold flush with the back seat so that the sedan accommodates seven. The model has four doors. A glass partition between the front and rear compartments can be furnished if desired.

The interior woodwork is of walnut and the hardware of special design with satin silver finish. The windows are crank operated and are provided with silk shades. The fittings include a vanity case containing mirror, memorandum books and silver topped bottles, double ash tray and match holder, corner reading lights, dome lights and robe rail.

Cooler Weather Helps Philadelphia Business

PHILADELPHIA, Oct. 24—According to Charles C. Bulkeley, executive secretary of the Philadelphia Automobile Trade Association, the automobile industry has improved notably since the cooler weather set in. He expresses the opinion that sales will steadily increase and that the automobile show, to be held in January, will begin one of the best years the industry has experienced.

Automobile dealers here generally state that business has improved decidedly since Oct. 1. Increases over September sales are estimated at from 10 to 40 per cent, by a majority of the large distributors here.

CITIZENS AID WAYNE TIRE

ORRVILLE, OHIO, Oct. 24—Citizens of Orrville have pledged $50,000 towards a fund of $75,000 asked by the Wayne Tire & Rubber Co. to make necessary improvements in its plant. The company is said to have liquidated its indebtedness and proposes to increase the capacity of its factory to keep up with demand which is now running in excess of production, although the plant is being operated 24 hours a day.

Britain Increases Imports in Tires

Receipts and Shipments of Automobiles Show Falling Off During September

LONDON, Oct. 16 (*By Mail*)—September is a comparatively slack month for the British automobile trade, and this year it has well maintained the tradition. Compared with August there was a drop of $427,790 in imports of vehicles and chassis and of $47,950 in parts, but a most remarkable increase of $941,315 in tires.

British automobile exports showed a drop of $38,420 for vehicles and chassis; of $20,865 for parts, and an increase of $192,460 for tires, compared with August's values. Thus, although the trade has been quiet, it showed a good increase under both heads, imports and exports being respectively $465,575 on imports and $122,175 for British exports.

Considering the imports, the number of cars was 565 (1264), trucks 48 (804), and chassis 310 (1231), and motorcycles and tricar 1557 (105)—the figures in brackets being the corresponding month's figures in 1920. The value of imported vehicle parts and components was $661,-815 ($6,982,715) and of motorcycle and tricar parts $75,215 ($82,245), and tires (value) $2,924,565 ($2,909,730).

British export of cars numbered 29 to British India (103), 6 to New Zealand (58), and 80 to other countries (304)—total 115 (465); trucks to British India 4 (32), to New Zealand none (7), and to other countries 27 (72)—total 31 (111); chassis to British South Africa none (1), to other countries 47 (452)—total 47 (453); motorcycles and tricars (destination not scheduled) 425 (2815). Parts valued $457,345 ($883,835), motorcycle and tricar parts $94,205 ($317,649), and tires $826,735 ($257,430).